

Magnetism

&

STATIC

Electricity

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Magnetism

What is magnetism? **Magnetism** is a pulling force between a **magnetic** object and a magnet. **Iron**, **nickel** and **cobalt** are the only known magnetic materials. They are **metals**, but not all metals are magnetic. For example, copper, gold, silver, and aluminum are not magnetic and a magnet does not stick to them. Magnets also **attract** or **repel** each other. **Attraction** is a pulling force, but **repulsion** pushes two magnets apart. Opposite poles of magnets attract and like poles repel.

My Word Wall

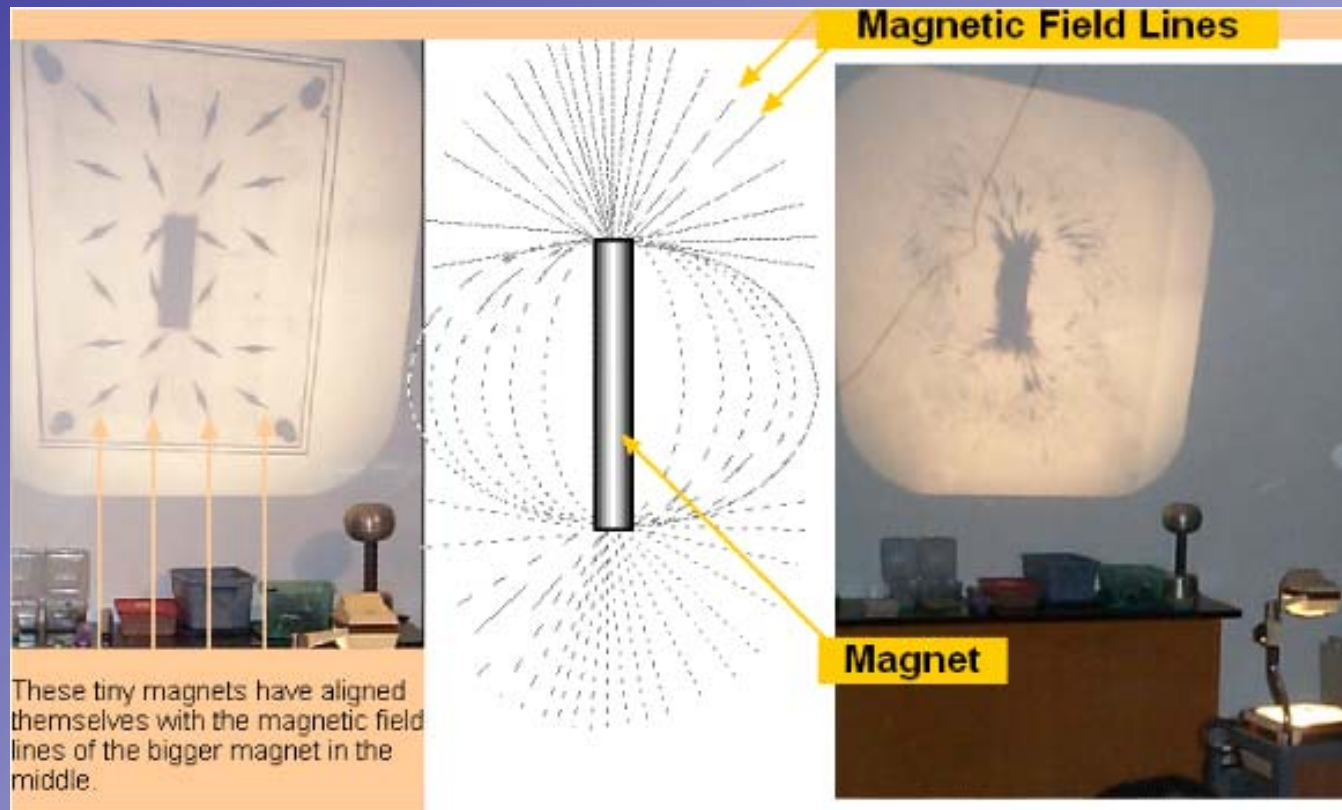
Experiments:

1: Magnetism is a Force

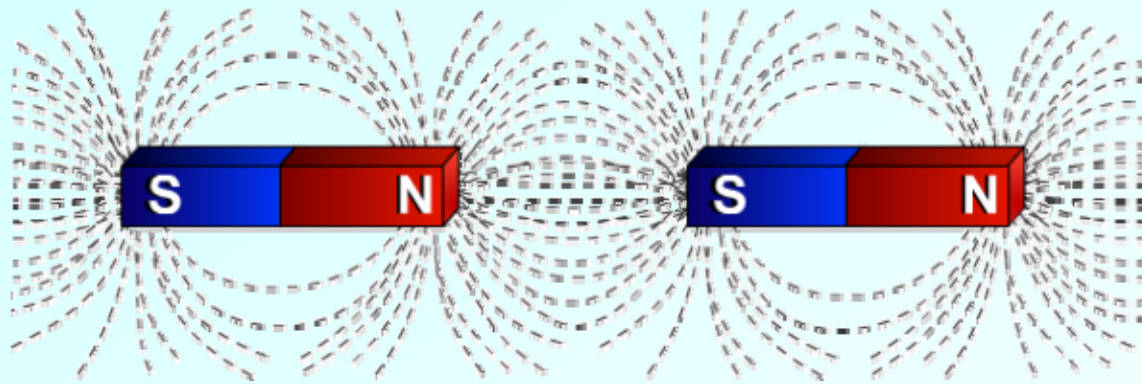
2: Magnetize a nail.

3: Attraction and Repulsion

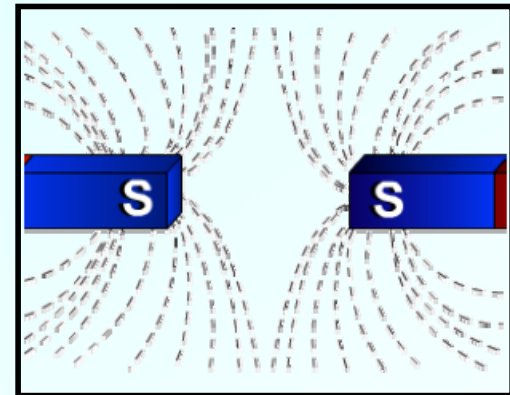
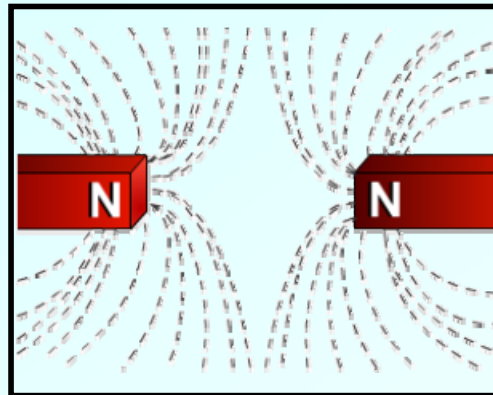
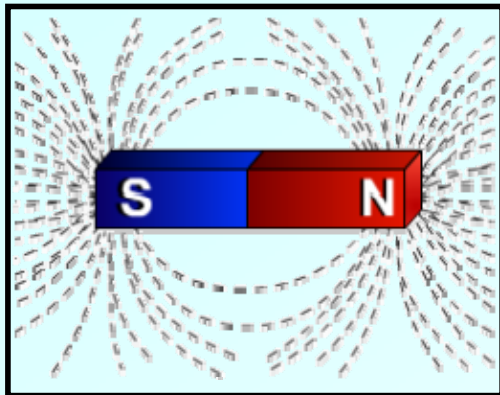
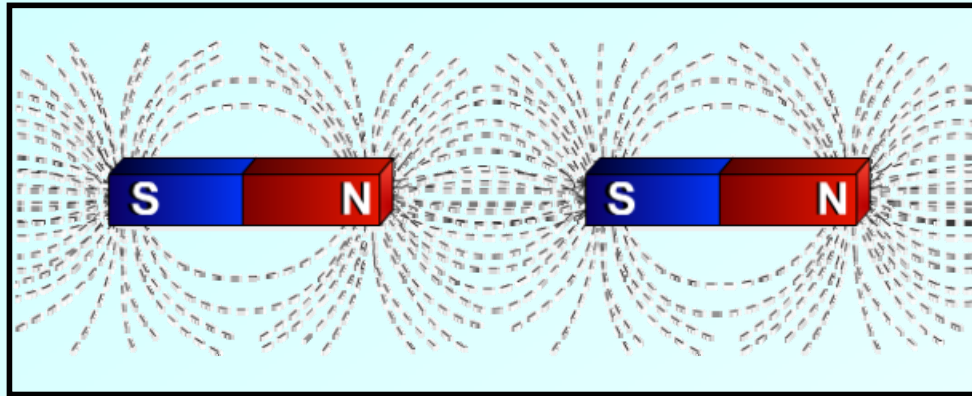
4: Make an electromagnet.



Magnetism is a force.



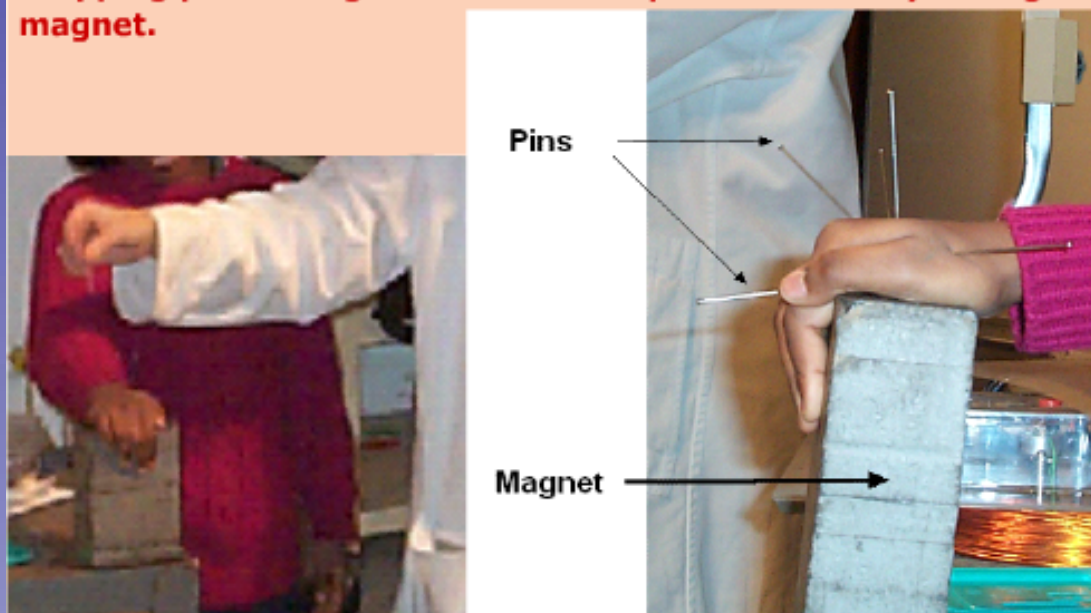
Magnetism is found in an invisible **field** around the magnet. This force is strongest near the **poles** and gets weaker as you get farther away from either the North or South pole.



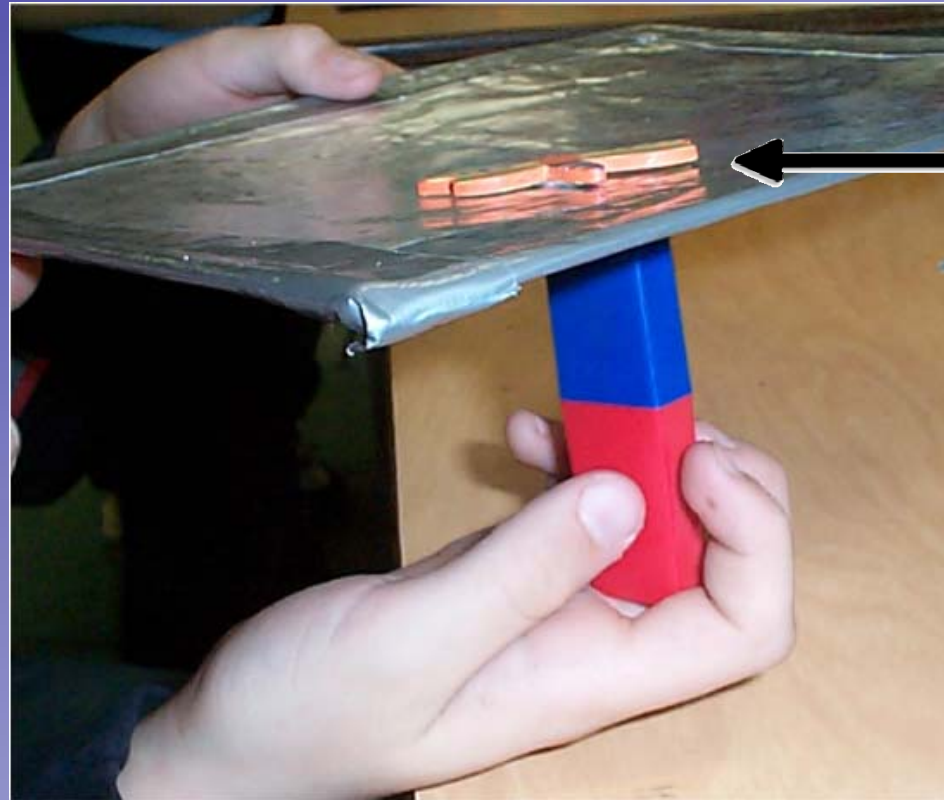
Place a transparent sheet on top of a single magnet. Sprinkle some **iron filing** on the sheet. Observe the pattern that **emerges**. Repeat this experiment with two attracting and repelling magnets. Record your observations.

Magnetic Force:

Magnetic force or magnetism is found in a 'field' near a magnet. This force can go right through your hand! Here a scientist is dropping pins on a girl's hand that is placed on a very strong magnet.

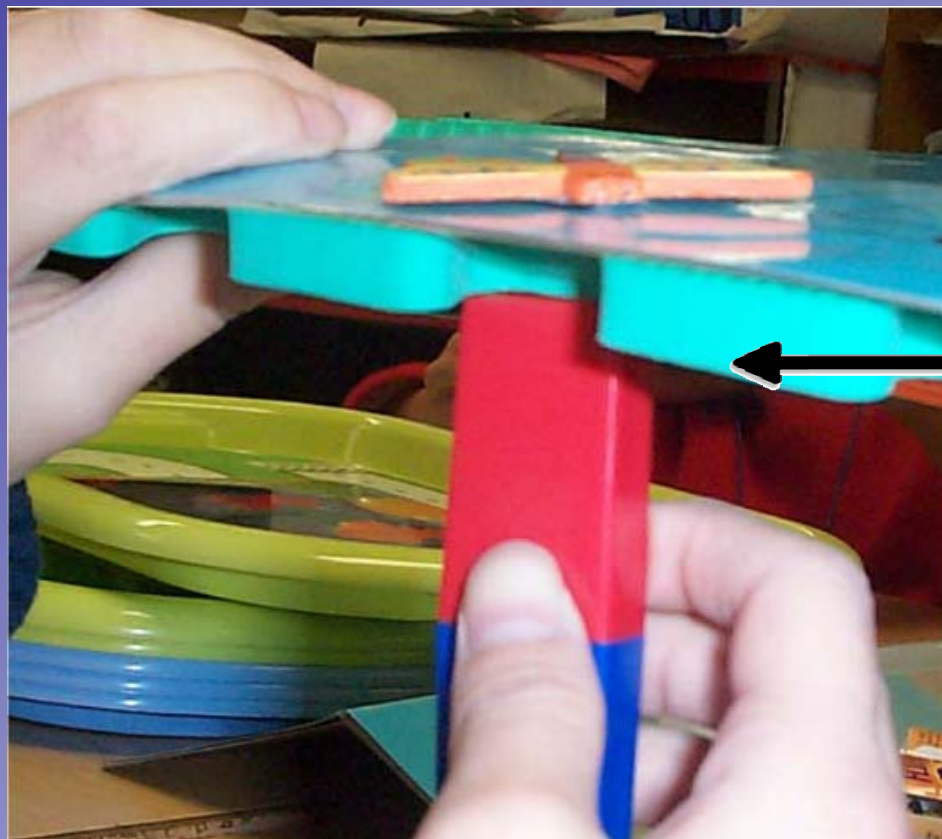


Magnetism easily goes through most materials, even your hand! Notice how the pins have **aligned** themselves along the magnetic field lines.

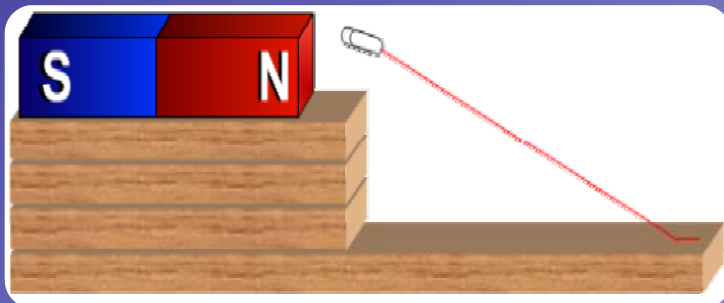


thin

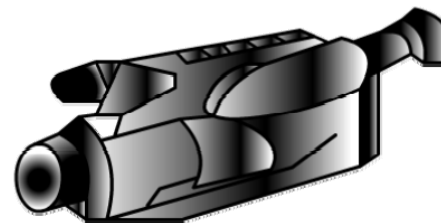
Test the strength of your magnet through a thin cardboard. What do you notice?



Test the strength of your magnet through something much thicker, such as a book (about 2 cm). What do you notice? What happens to the magnet's strength if you increase the thickness of the material? Why?



Click Here!



Click to see video.

Magnetism is an indirect force. A magnet can pull a paperclip before it makes contact with it.

Repeat the experiment you see in the picture and video above. You will need a strong magnet, a piece of tape, thin thread or fishing line, and a variety of magnetic and non-magnetic materials.

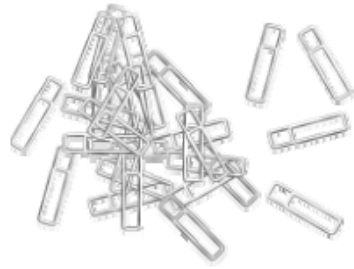
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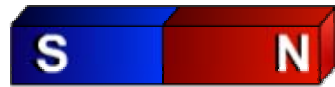
4: Make an electromagnet.



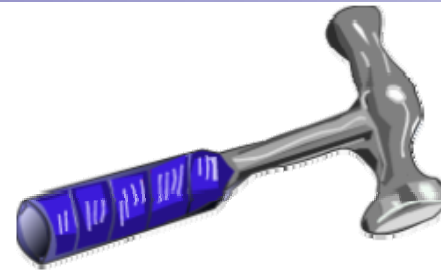
paperclips



an iron nail



a magnet

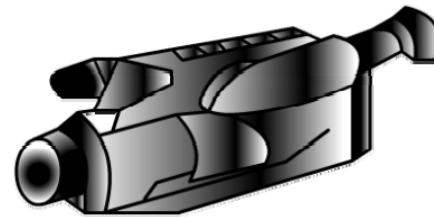


a hammer

For experiment 2, you will need a nail, some paperclips, a strong magnet and a hammer.



Click Here!



Click to see video.

If you rub a magnet's pole on an iron nail, you will **magnetize** it. You must rub the magnet repeatedly in one direction as shown in the video.



Test your magnet.



Hitting a magnetized nail with a hammer will **demagnetize** it. Extreme heat will have the same effect on magnets.

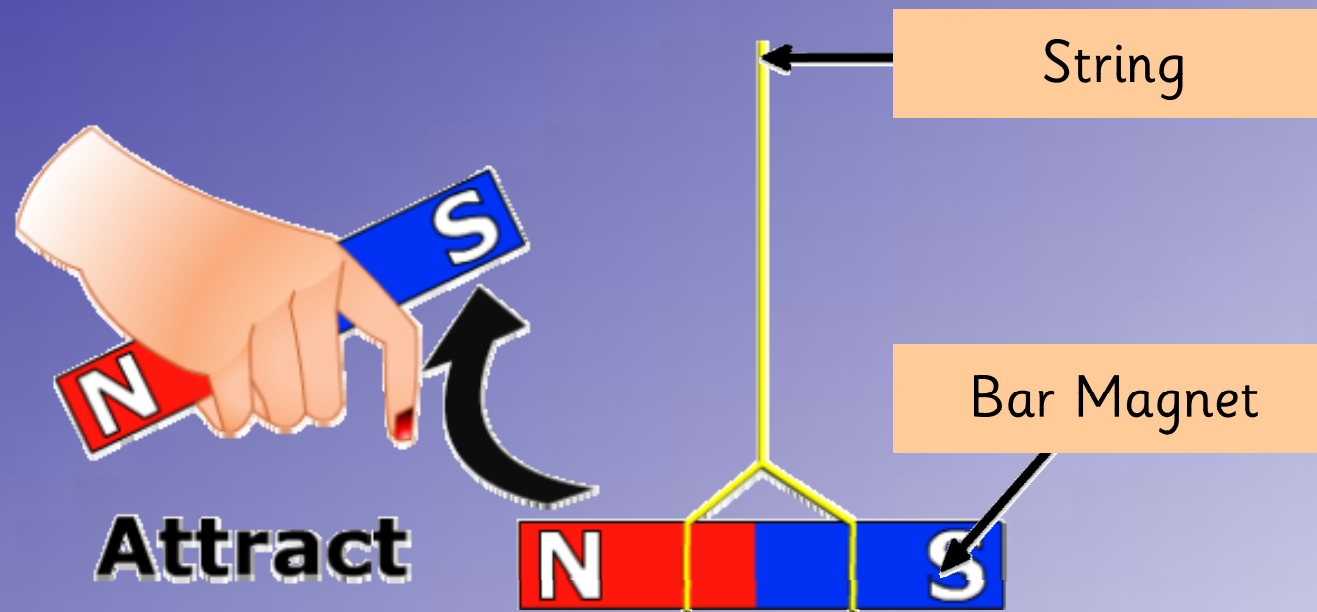
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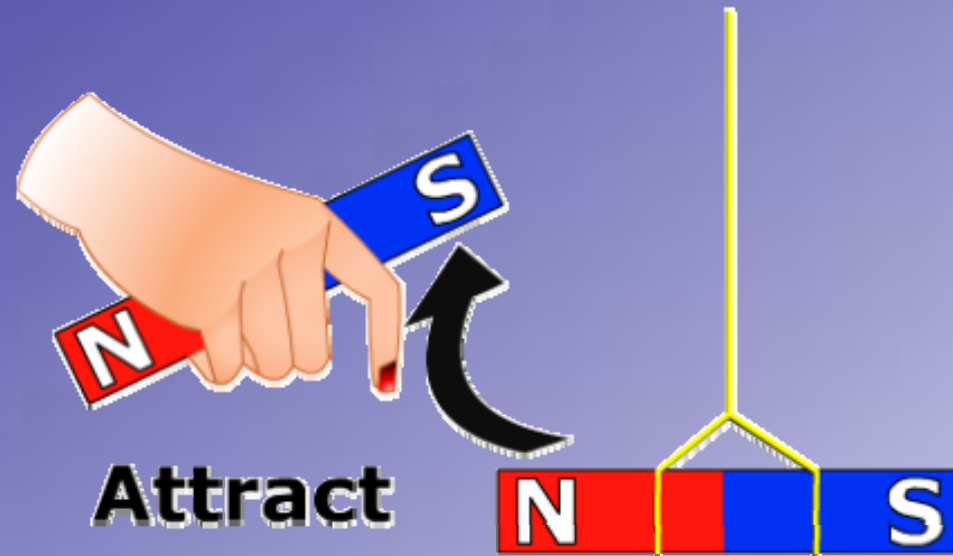
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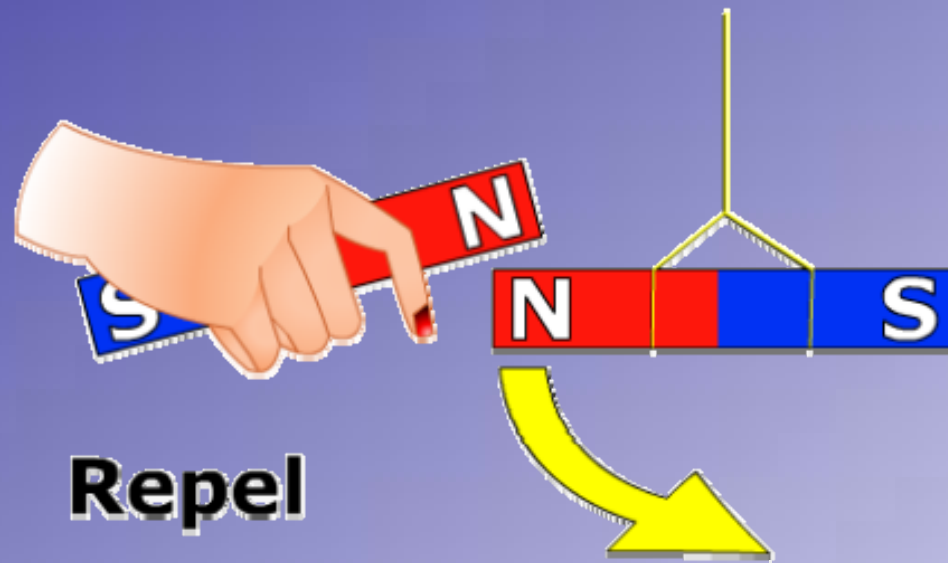
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For experiment 3, you will need 2 bar magnets and a piece of string.

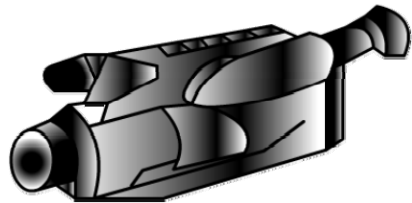


Suspend a magnet. Observe what happens when you bring another magnet close to the suspended magnet.



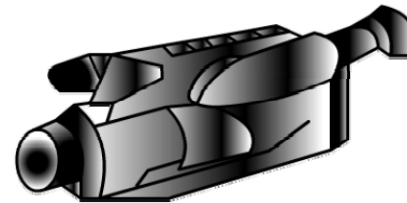
Test every possible combination of poles (i.e., N-N, S-S, N-S, and S-N). Record your [observation](#).

Click Here!



Click to see video.

Click Here!



Click to see video.

Attraction:

Opposite poles of magnets
attract.

Repulsion:

Like poles of magnets repel.



North Pole

North Pole

Repulsion Race

Experiments:

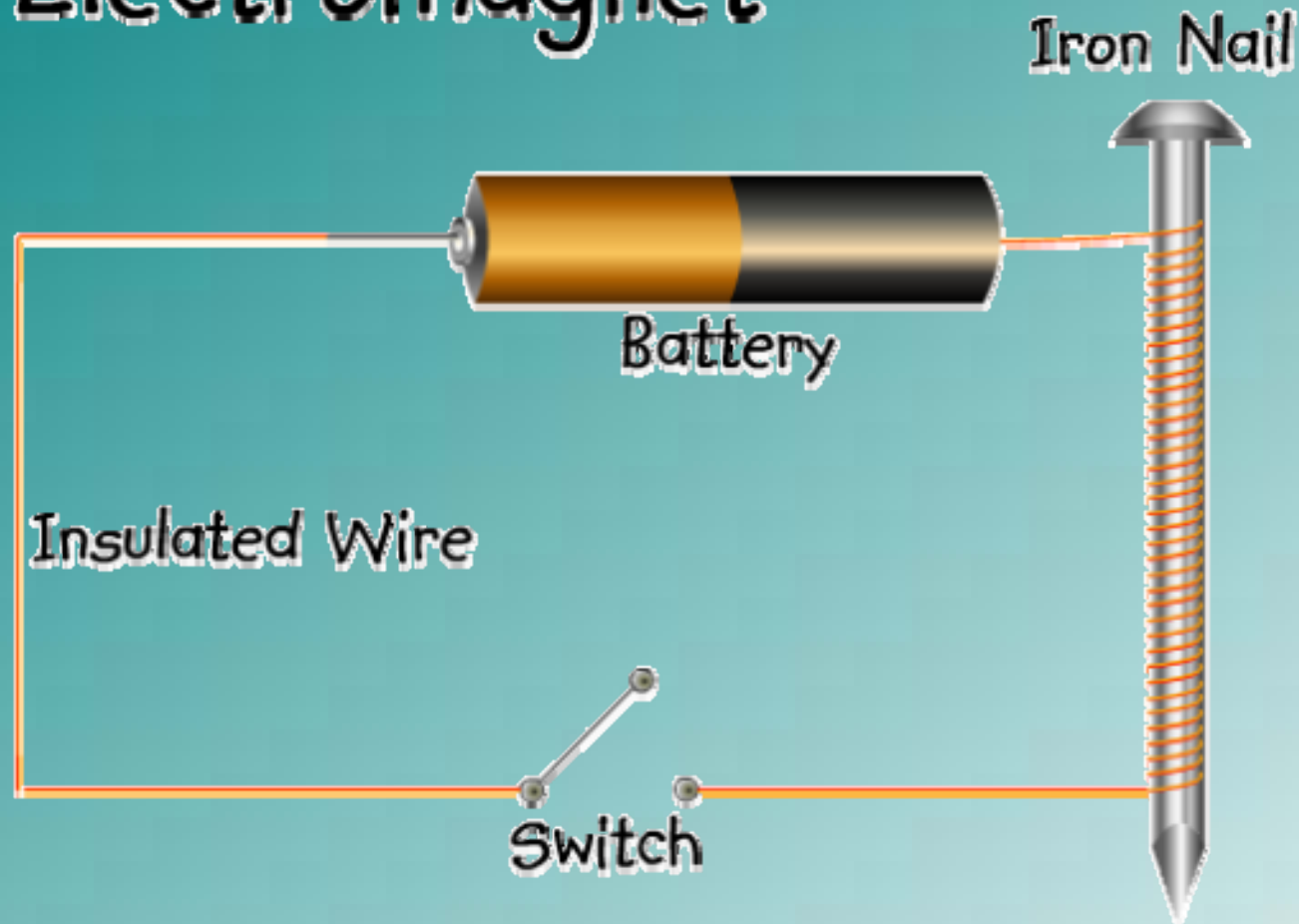
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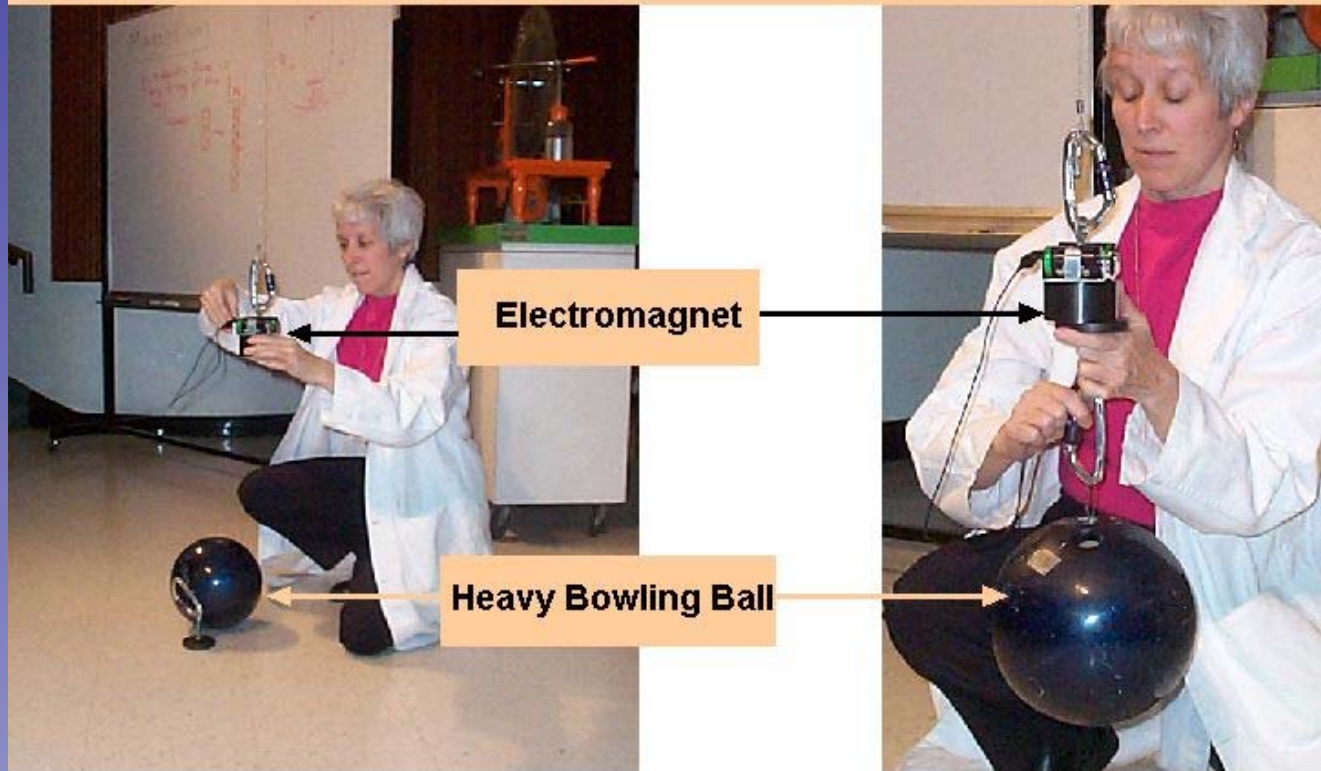
Electromagnet



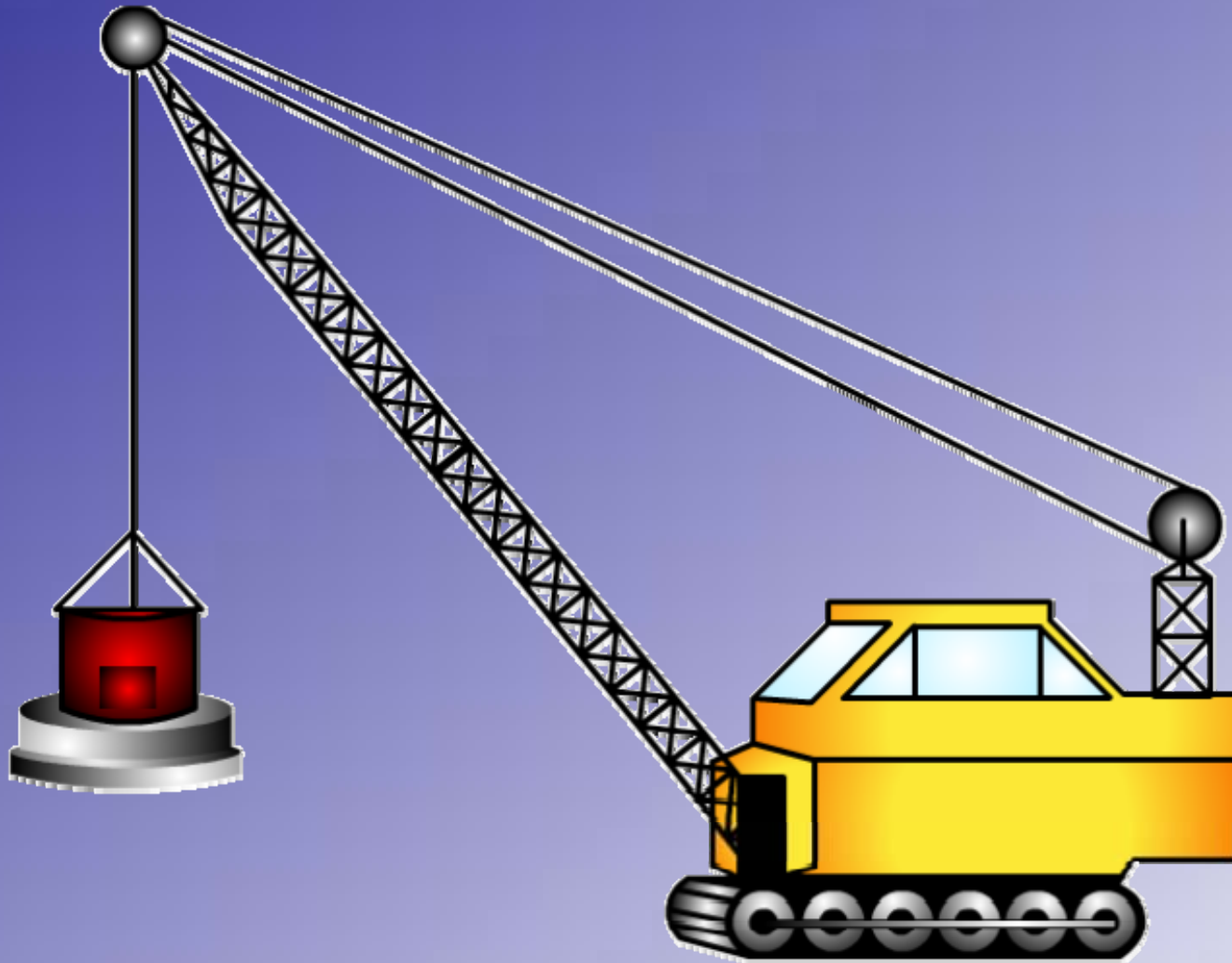
For experiment 4, you will need a strong battery, an iron nail, some **insulated wire**, a **wire stripper**, and a **switch**.

Electromagnets:

Electricity and Magnetism are closely related. Using electricity, you can make a special magnet called electromagnet that you can turn on and off!



Electromagnet



A special electromagnet is used in a junkyard to move scrap metal.



Click the paint cell and put the puzzle pieces together to make an electromagnet.

Static Electricity

What is **static electricity**? Buildup of **electrons** (negative charges) creates static electricity. Static **cling** and lightning are two examples that are caused by static electricity.

Static cling happens when your clothes rub against each other in the clothes drier. Charges build up on the clothes causing them to stick to each other or to your body when you put them on. Obviously, this will not happen if you hang your laundry to dry!

My Word Wall

Lightning is caused when electric charges build up in **thunderclouds** as tiny ice crystals within them **collide**. The negative charges build up at the bottom of the clouds.

This also forces a **buildup** of positive charges on the ground, especially on tall things, such as big trees, mountains, towers, etc.

Eventually, the buildup of charges and the attraction between the opposite charges in the clouds and on the ground are so great that the negative charges jump to the ground causing a **massive** spark of electricity called lightning. Electric charges can also jump within a cloud or from one cloud to another.

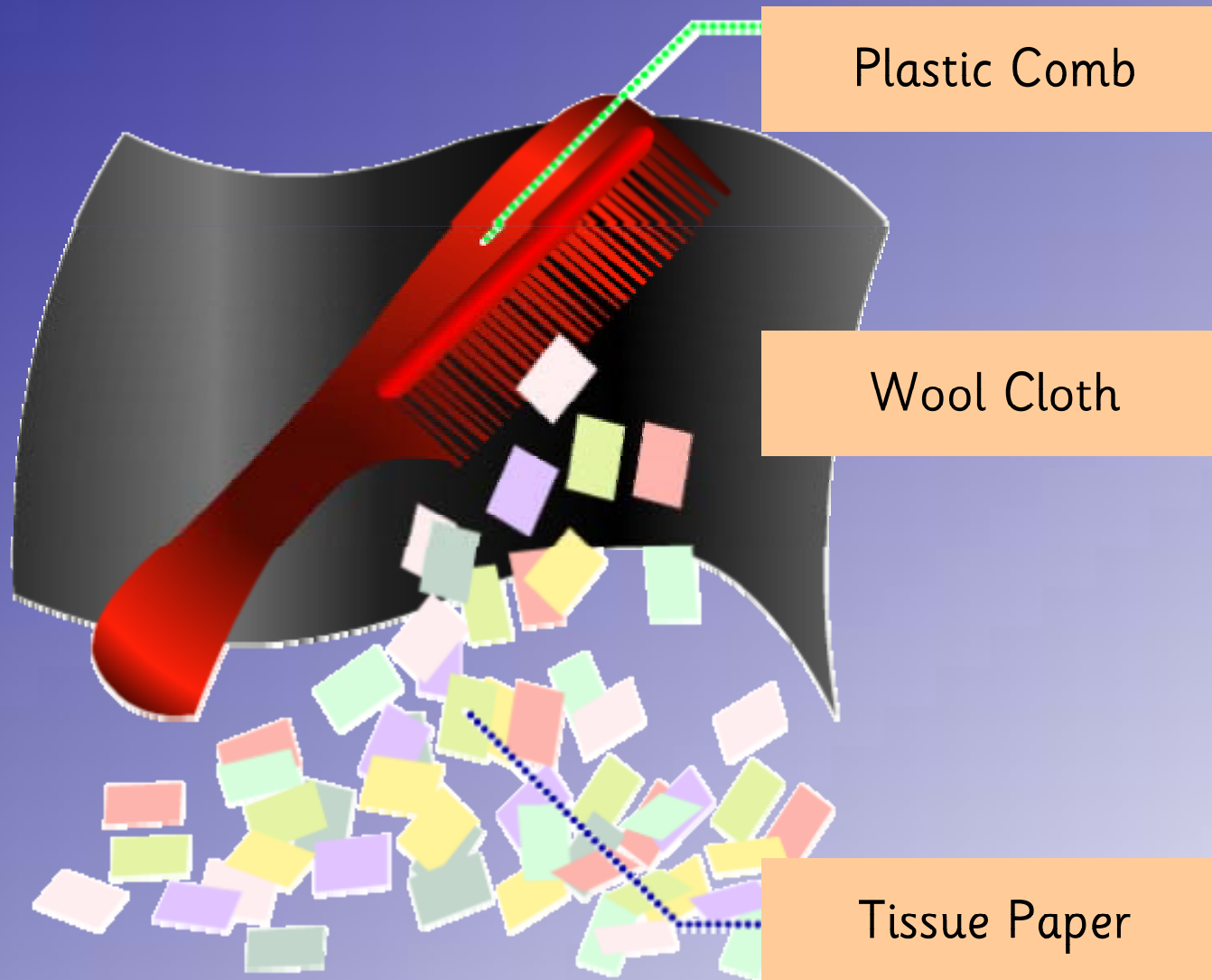
Experiments:

1: Comb and Tissue Paper

2: Charged Balloons - Attraction and Repulsion

3: Static Popcorn?

4: Have a Piece of Shock Pie!



For experiment 1, you will need a plastic comb, a piece of wool cloth and tissue paper.



A comb can pick up static electric charges.



A charged comb can pick up pieces of tissue paper.

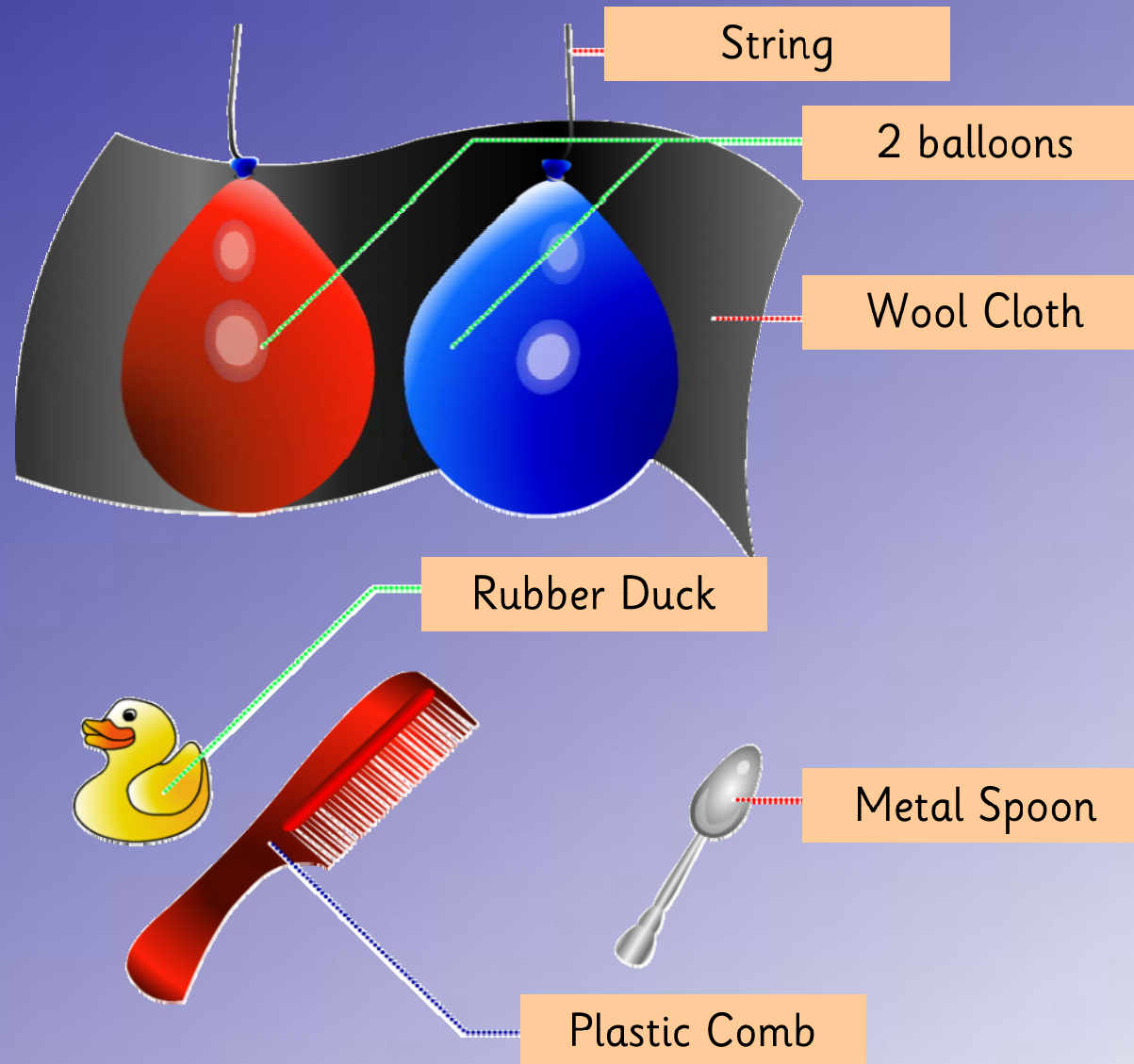
Experiments:

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For experiment 2, you will need a plastic comb, a rubber duck, wool cloth, string, and a **metal** spoon.



Rub a balloon with wool cloth and hang it with a piece of string.



Bring a plastic comb close to your balloon. What happens?



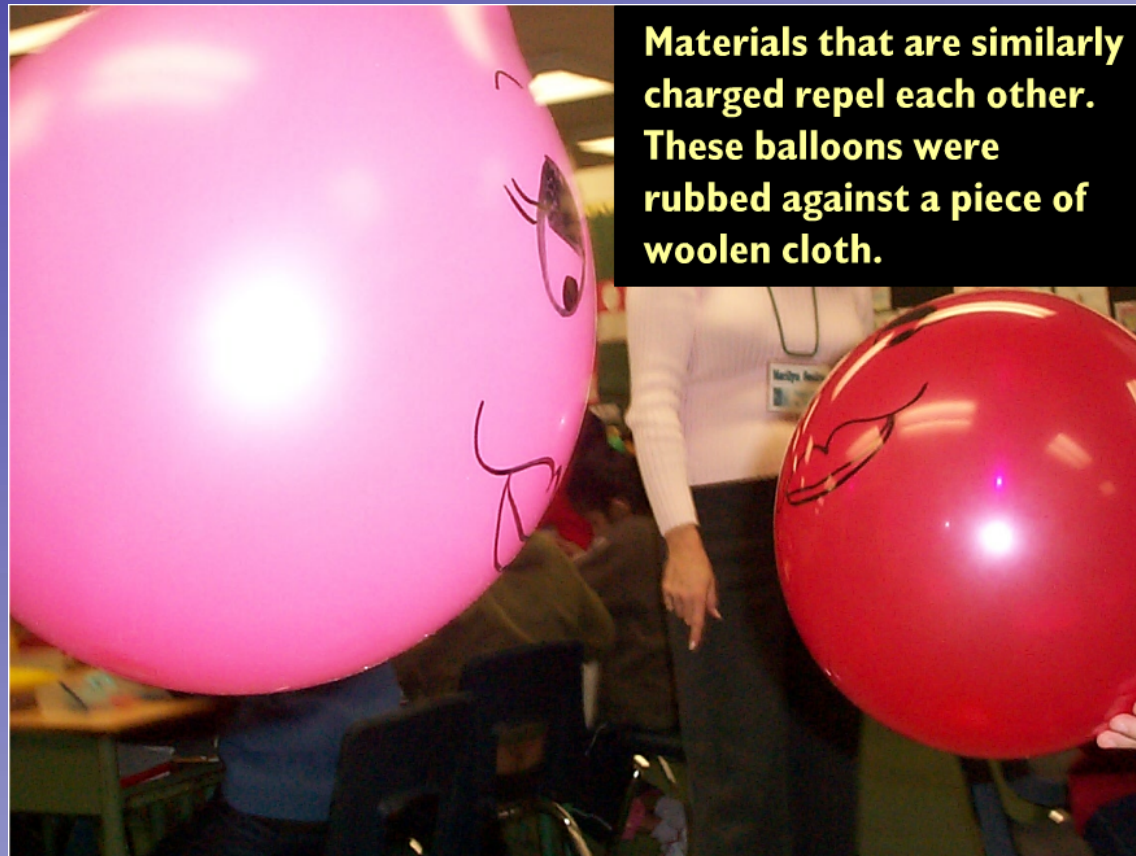
What happens when you bring a rubber duck close to the balloon?



How does the balloon react to a metal spoon?

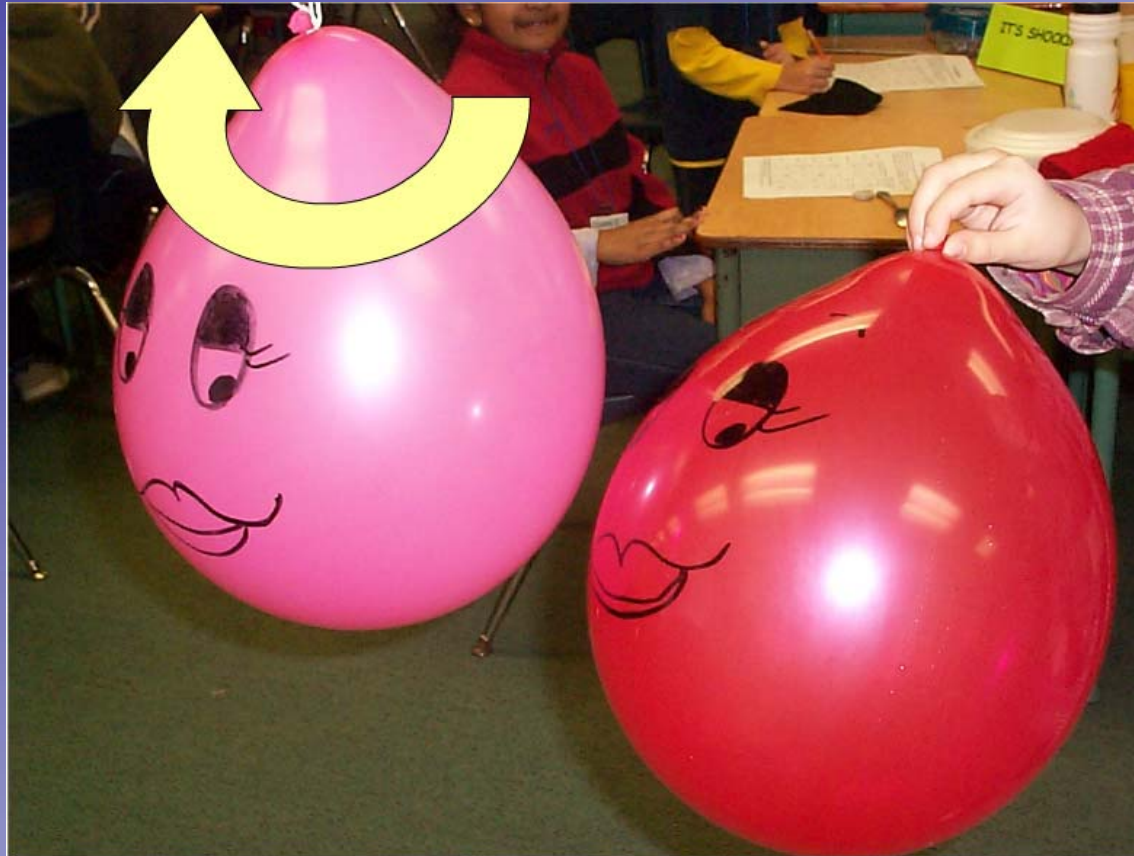


How do two charged balloons react when you bring them close to each other?



Materials that are similarly charged repel each other. These balloons were rubbed against a piece of woolen cloth.

The faces of the balloons were rubbed with a wool cloth. Charges are **localized** in the "face" areas of the balloons.



When you bring one balloon closer to the other, they repel, causing the second balloon to move and turn away.



Wipe the balloons with a wet cloth. Repeat the experiment. How do the balloons react to other objects and each other?

Experiments:

1: Comb and Tissue Paper

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4: Have a Piece of Shock Pie!



Plastic or Foam Plate



Wool Cloth



Pieces of Paper

For experiment 3, you will need a piece of wool cloth, a plastic plate, an aluminum pie plate, and very small pieces of paper (from the hole puncher).



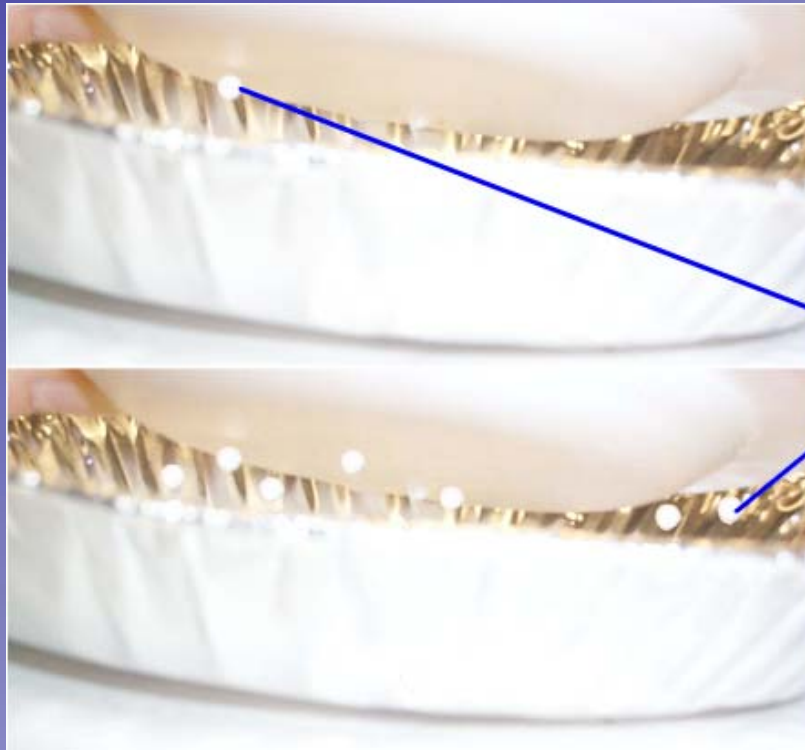
Rub a plastic plate with a wool cloth to charge it.



Place small pieces of paper in an
aluminum plate.



Bring the charged plate close to the aluminum plate.



**Pieces of paper
popping up!**

Watch the pieces of paper pop up
like popcorn!

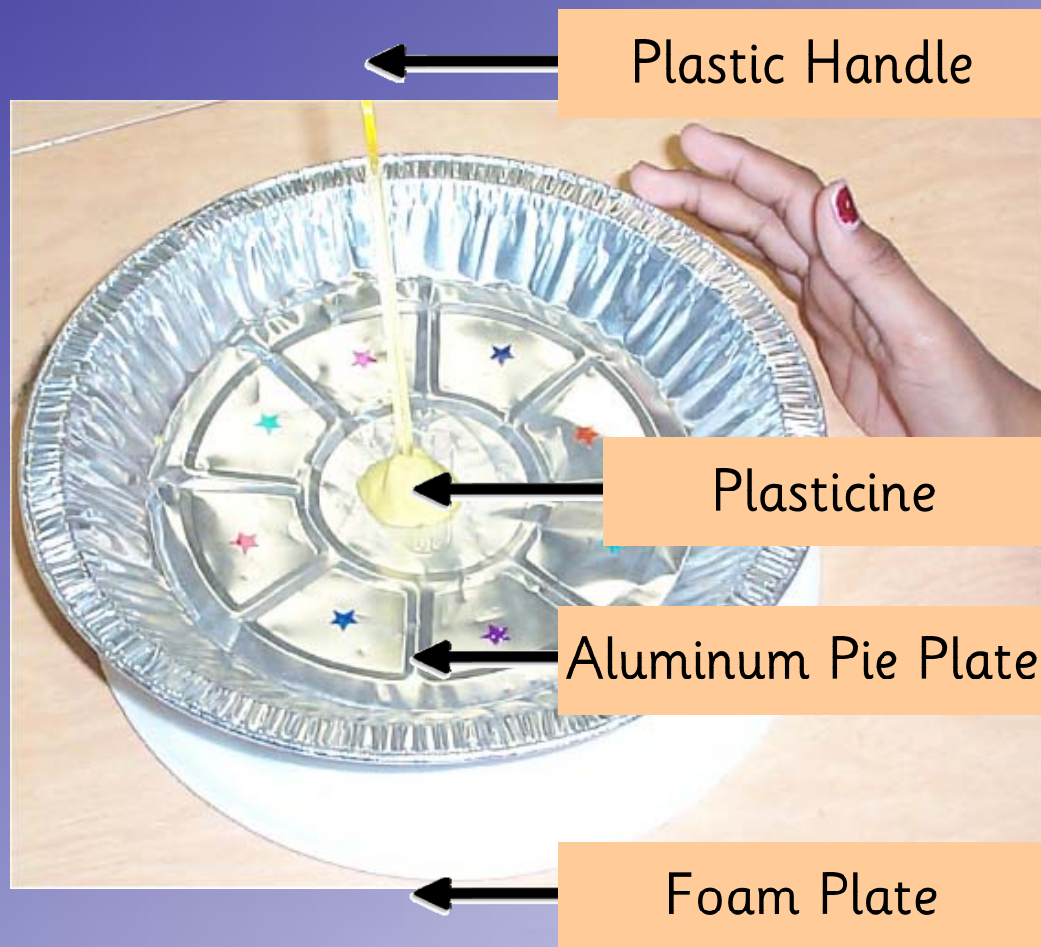
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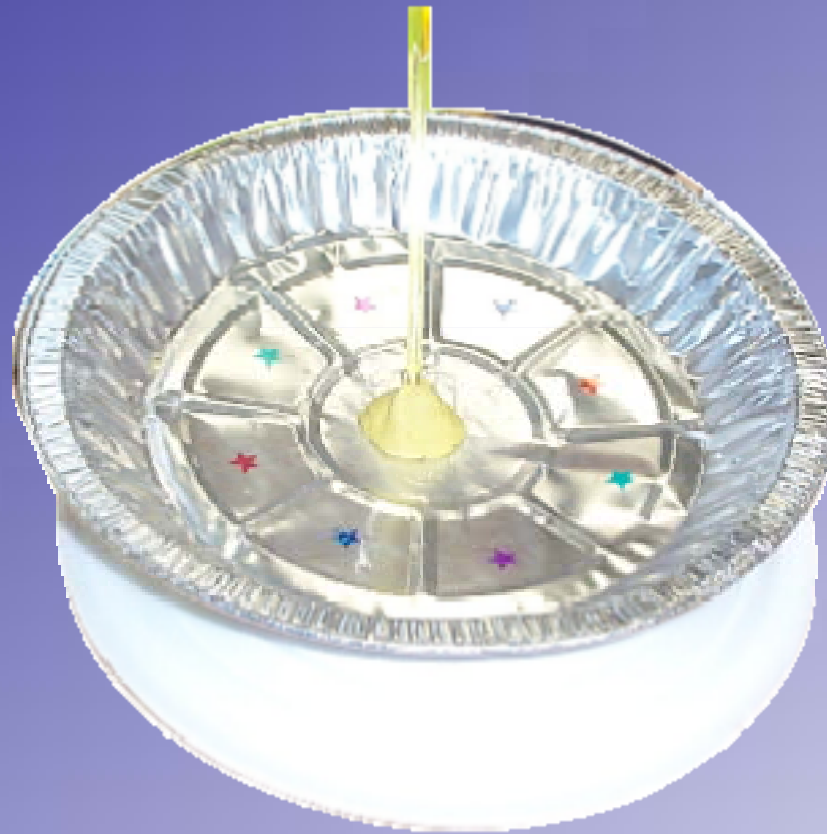
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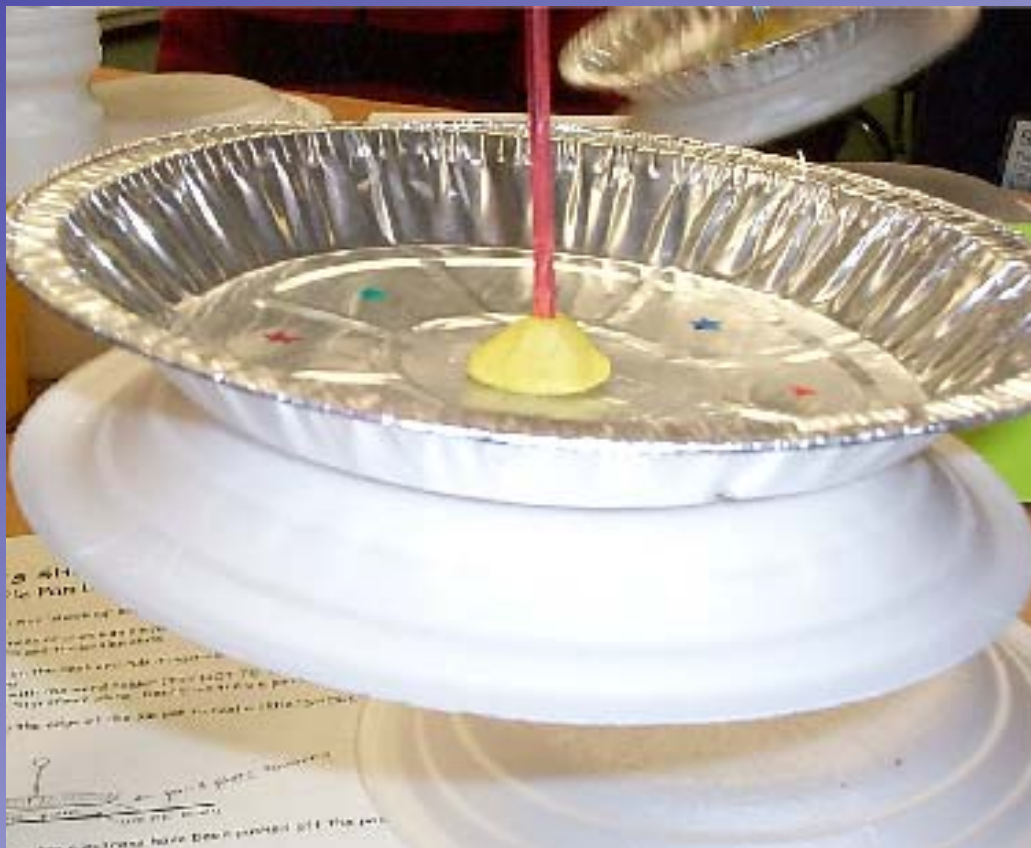
For experiment 4, you will need a piece of wool cloth, a foam plate, an aluminum pie plate, a plastic handle (straw), and **Plasticine** clay.



1. Rub a **foam** plate with wool cloth.



2. Place the aluminum pie plate on the charged foam plate, holding it by its plastic handle.



3. The aluminum and foam plates cling together. Do not touch the aluminum part until you are ready to be shocked!



Static electricity can give you a shock!

Use the guidewords or the arrows below to find the word definition you are looking for.

1. aligned – attraction

2. buildup – collide

3. copper – electricity

4. electromagnet – field

5. foam – insulated wire

6. iron – localized

7. magnet – magnetite

8. magnetize – nickel

9. nonmagnetic – plastic

10. Plasticine – push

11. repel – steel

12. suspend – wire stripper

aligned: (*from align*) lined up, arranged in a line

aluminum: a silvery white nonmagnetic metal. It is light in weight.

attract: a pulling force between the opposite poles of two magnets or between a magnet and a magnetic metal

attraction: see attract

buildup: steady increase of anything such as electric charges

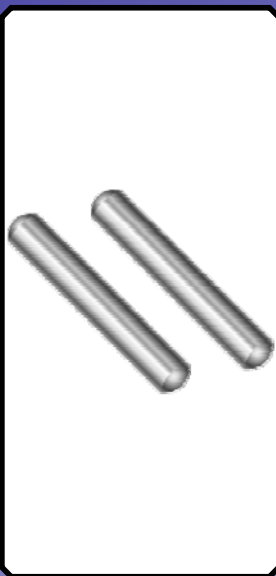
charges: referred to buildup of electrons (negative charges) or lack of them (positive charges)

cling: to stick or hang on to something

cobalt: a magnetic metal

collide: crash, bump into

copper: a reddish brown nonmagnetic metal used in electrical wires and pennies



cow magnet: a small but very strong magnet, which is put in the cow's stomach to attract pieces of metal that the cow accidentally eats while grazing. The magnet attracts the metal pieces and stops them from damaging the cow's stomach and making it sick.

demagnetize: to make a magnet weaker or take away its magnetic force

electricity: a form of energy which is caused by the movement of electrons

electromagnet: a magnet that can be made by the flow of electricity through an insulated wire wrapped around an iron core, such as a nail.

electron: an extremely small, negatively charged particle

emerge: appear, come into view, come out

field: an area around a magnet where you find the magnetic force

foam: (*also called Styrofoam*) a soft and light plastic that is used to make disposable cups, plates, etc.

force: gravity, friction, buoyancy, muscular force, and magnetism are all forces. Forces can move objects, change the direction of moving objects, or make them slow down and stop.

indirect force: a force such as magnetism or gravity that does not need contact to pull or push away

insulated wire: electrical wire that is coated with plastic

iron: a heavy, silver coloured magnetic metal used to make steel

iron filing: tiny pieces of iron

like: same, as in same types of poles

localized: (from *local*) not spread out, limited to a small area

magnet: a piece of metal that can pull magnetic objects towards it or hold them in place.

magnetic: an object that can be magnetized, or attracted by a magnet

magnetism: magnetic force

magnetite: a rock that contains iron and have magnetic properties

magnetize: to make a magnet

massive: huge, very big

metal: Most metals are shiny and strong materials that can be made in to thin layers like aluminum foil or hammered in to different shapes.

nickel: a silvery white magnetic metal

nonmagnetic: opposite of magnetic, won't stick to magnets

observation: what you see in an experiment

opposite: not the same such as North vs. South

plastic: a manmade (not natural) material

Plasticine: a type of play dough or modeling clay

poles: the two endpoints of a magnet (south and north poles of the magnet)

pull: an attractive force

push: a repulsive force

repel: to push away

repulsion: (from *repe**l*) the act of pushing away

static electricity: a type of energy that is caused by buildup of electric charges

steel: a material made from iron

suspend: hang

switch: a control that can turn an electromagnet or other electrical devices on and off

thundercloud: a large and dark cloud that can make thunder and lightning

wire stripper: a tool for removing the plastic coating of an electric wire

magnetism

it

My Word Wall

is a

magnet's poles

and

is found in an invisible field

nonmagnetic materials

which

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around the magnet

,

is strongest near the

force

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Page
1

iron, nickel and cobalt

are examples of nonmagnetic
metals

and

copper, gold, silver, and
aluminum

are not magnetic




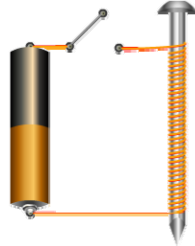
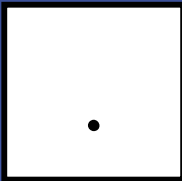
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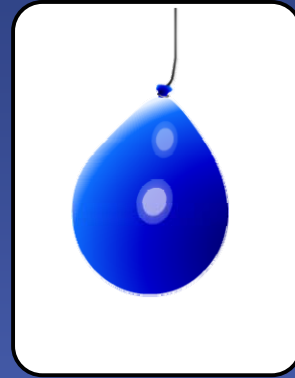
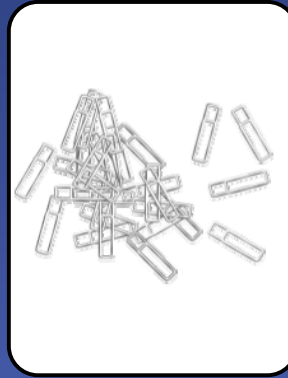
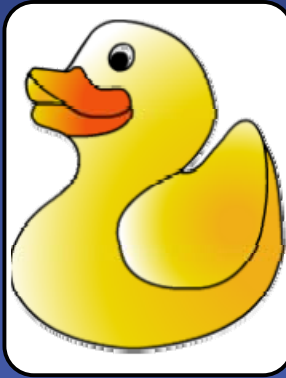
wood, glass, plastic, and all
other materials

are the only magnetic metals

.

All magnets	attract	and
opposite poles of magnets	repel	.
like poles	have two poles	
north pole of a magnet	attracts south pole of another magnet	

				is called
				
a	cow magnet	electromagnet	bar magnet	horseshoe magnet
an				



are

magnetic

not magnetic

and

.

but

,

Write about one of the science experiments you did.

My Word Wall

Click the links below to visit internet sites for more information:

1. Lightning in a Pan:

http://www.yesmag.bc.ca/projects/lightning_pan.html

2. Magnetism:

http://www.windows.ucar.edu/tour/link=/physical_science/magnetism/m

3. Lightning:

<http://www.weatherwizkids.com/lightning1.htm>

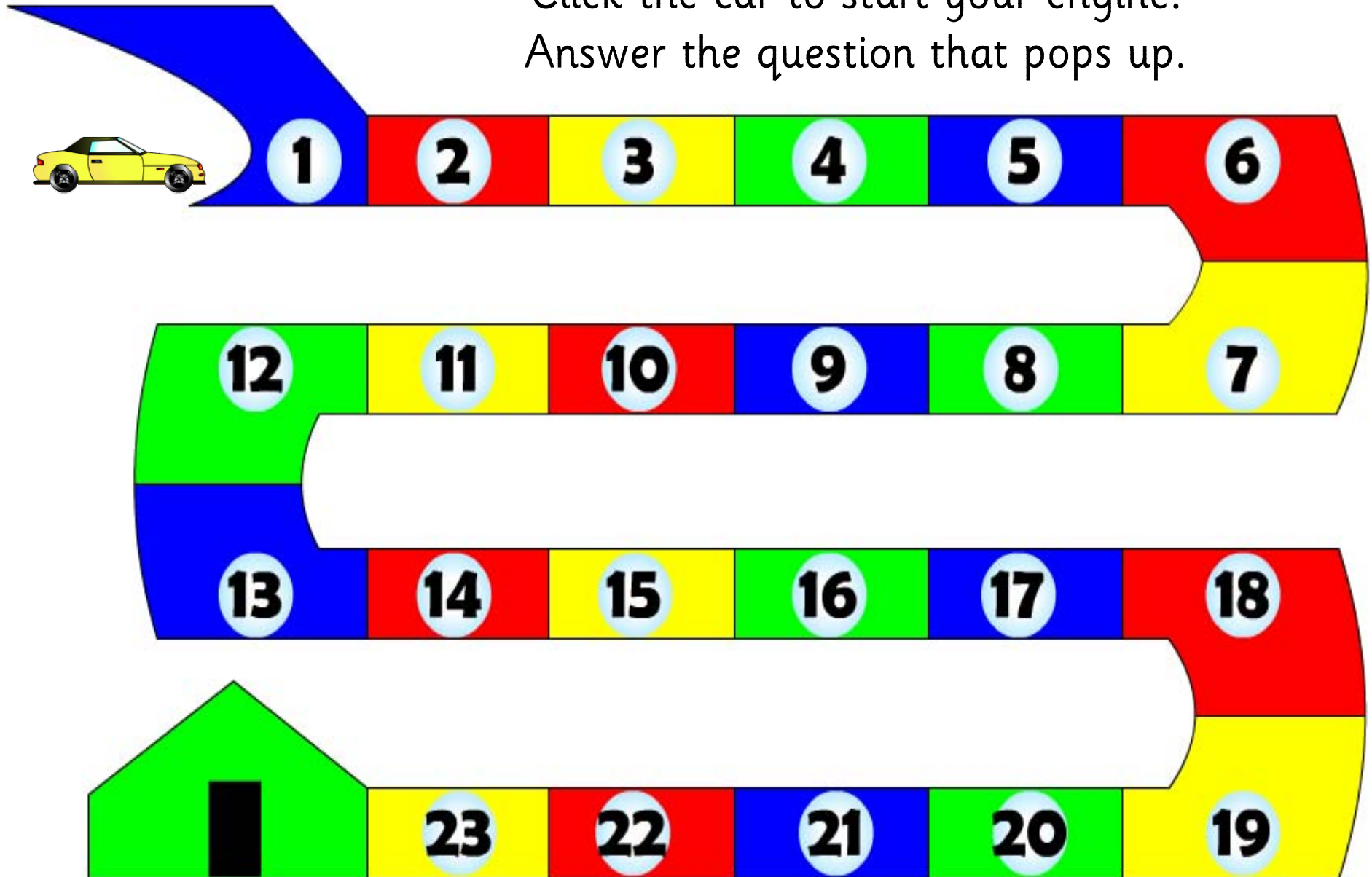
4. Types of Magnets:

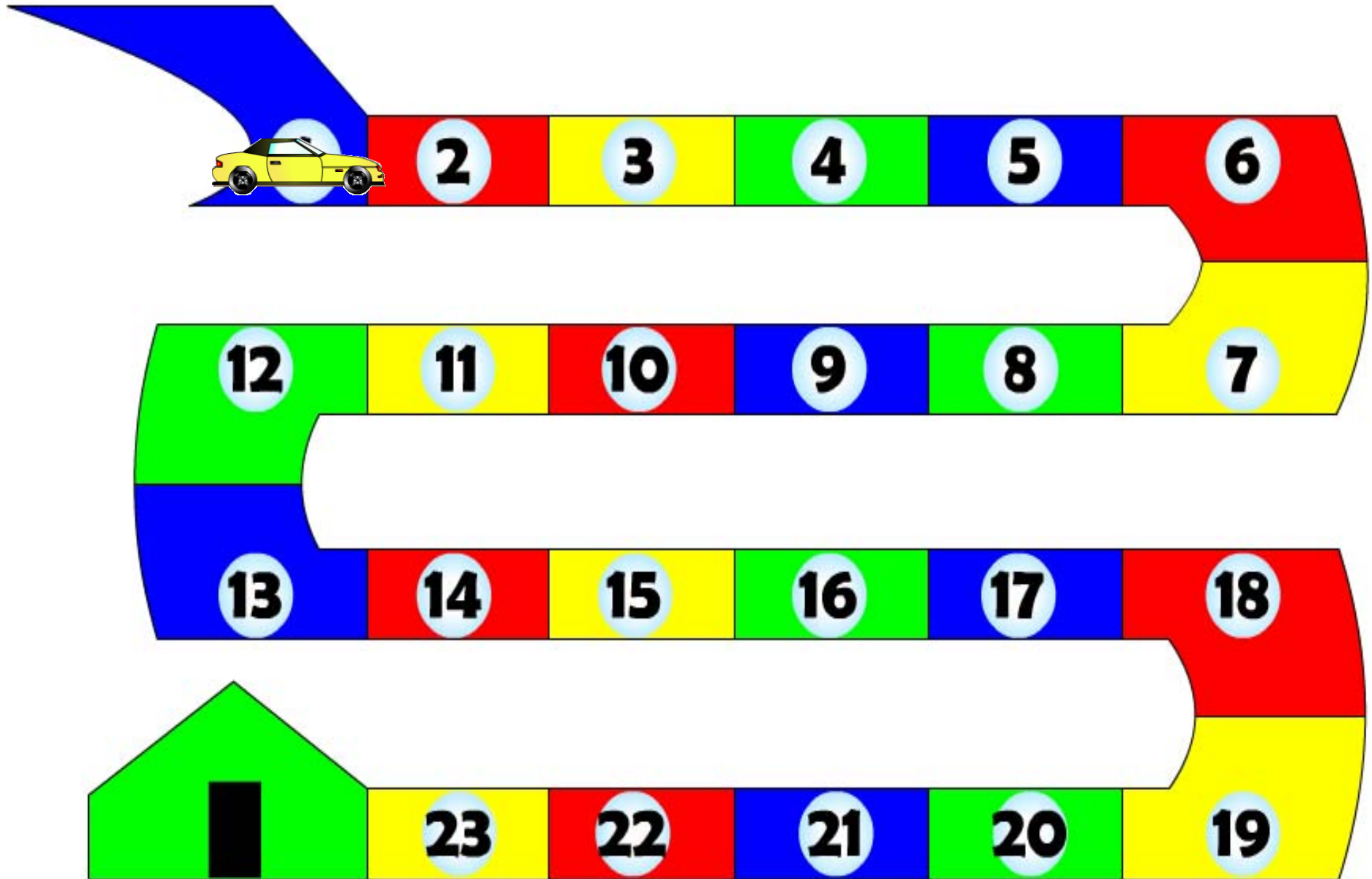
<http://www.coolmagnetman.com/magtypes.htm>

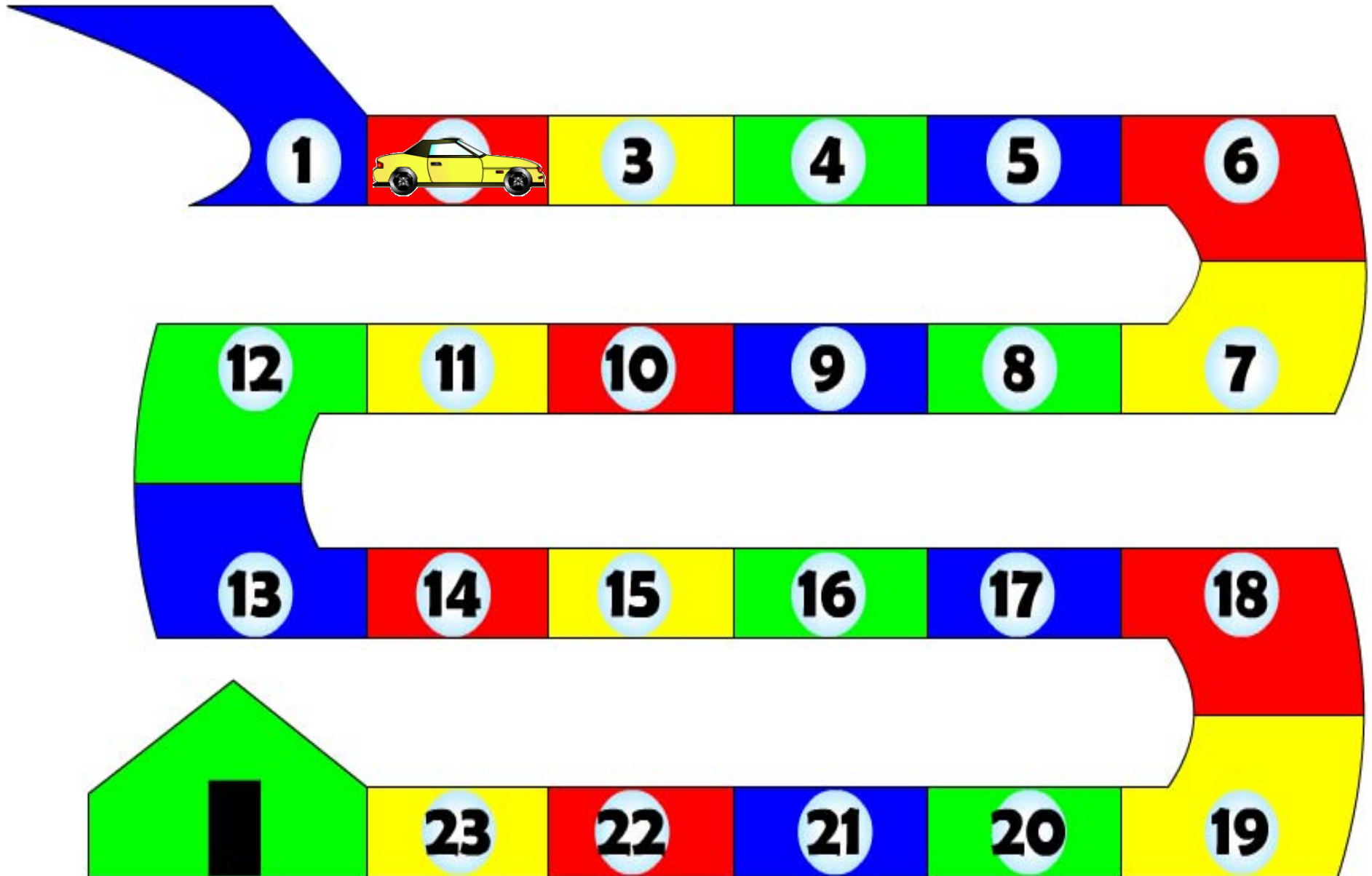
5. Enter Next Link here:

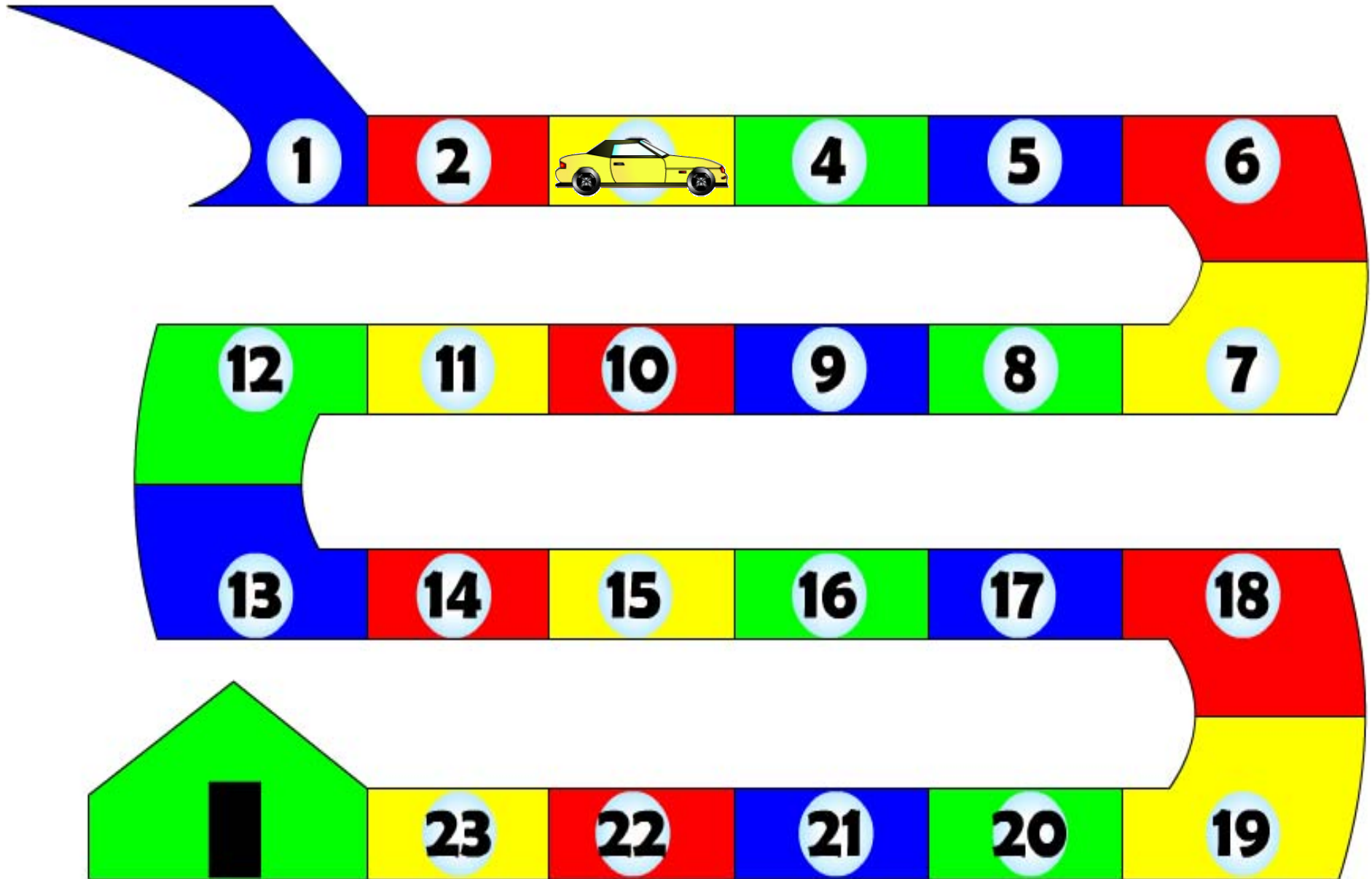
My Word Wall

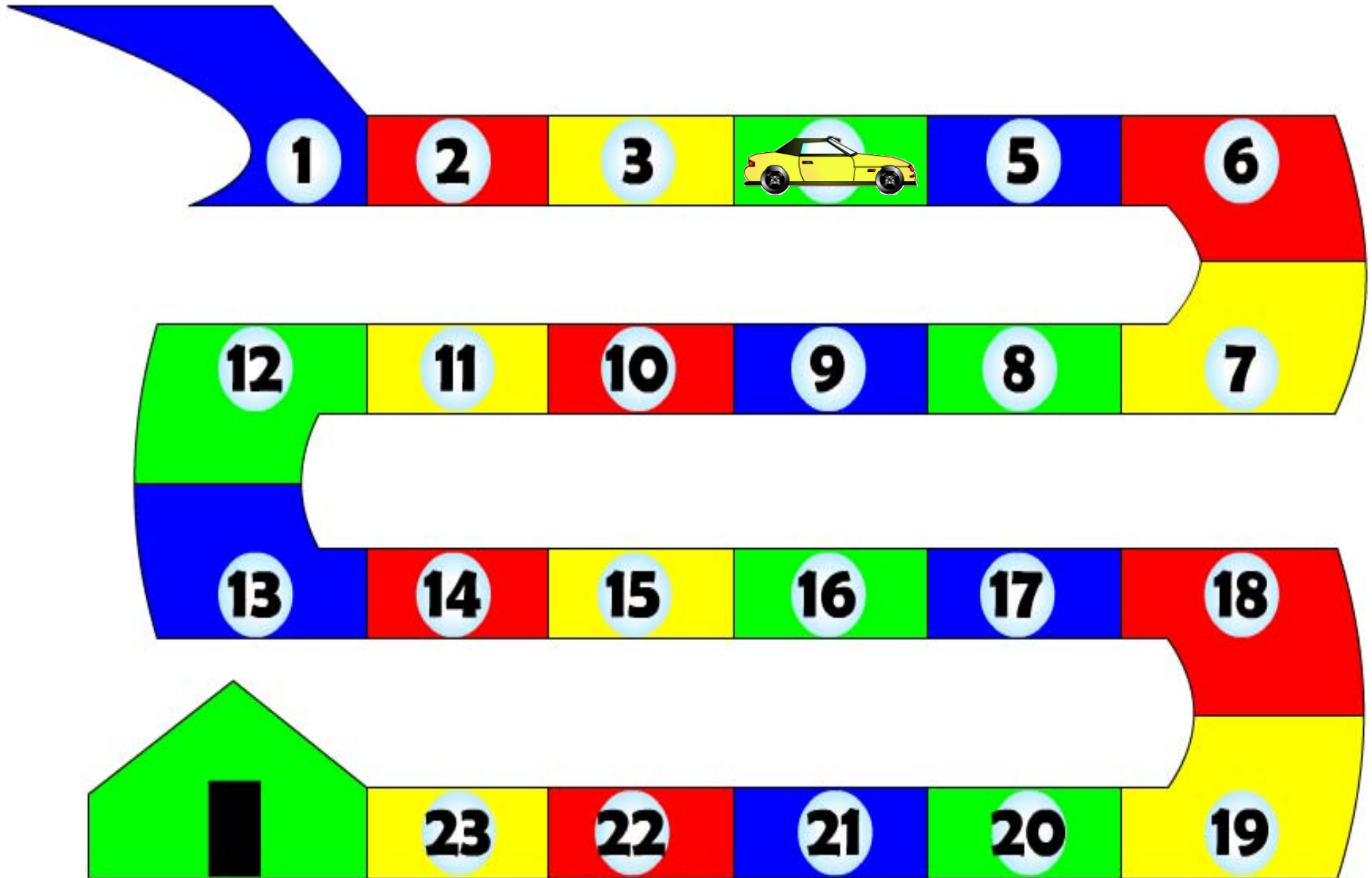
Click the car to start your engine!
Answer the question that pops up.

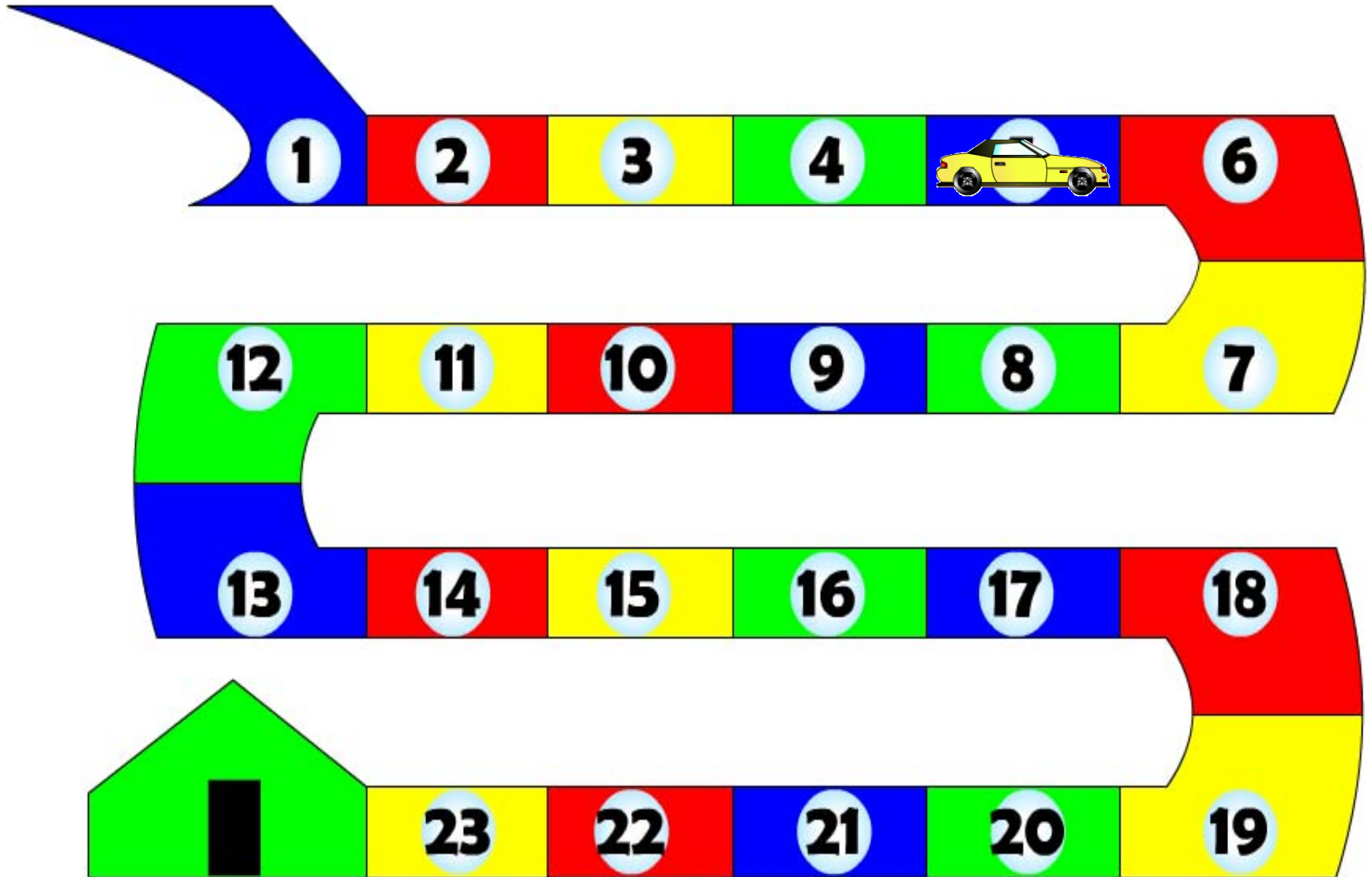


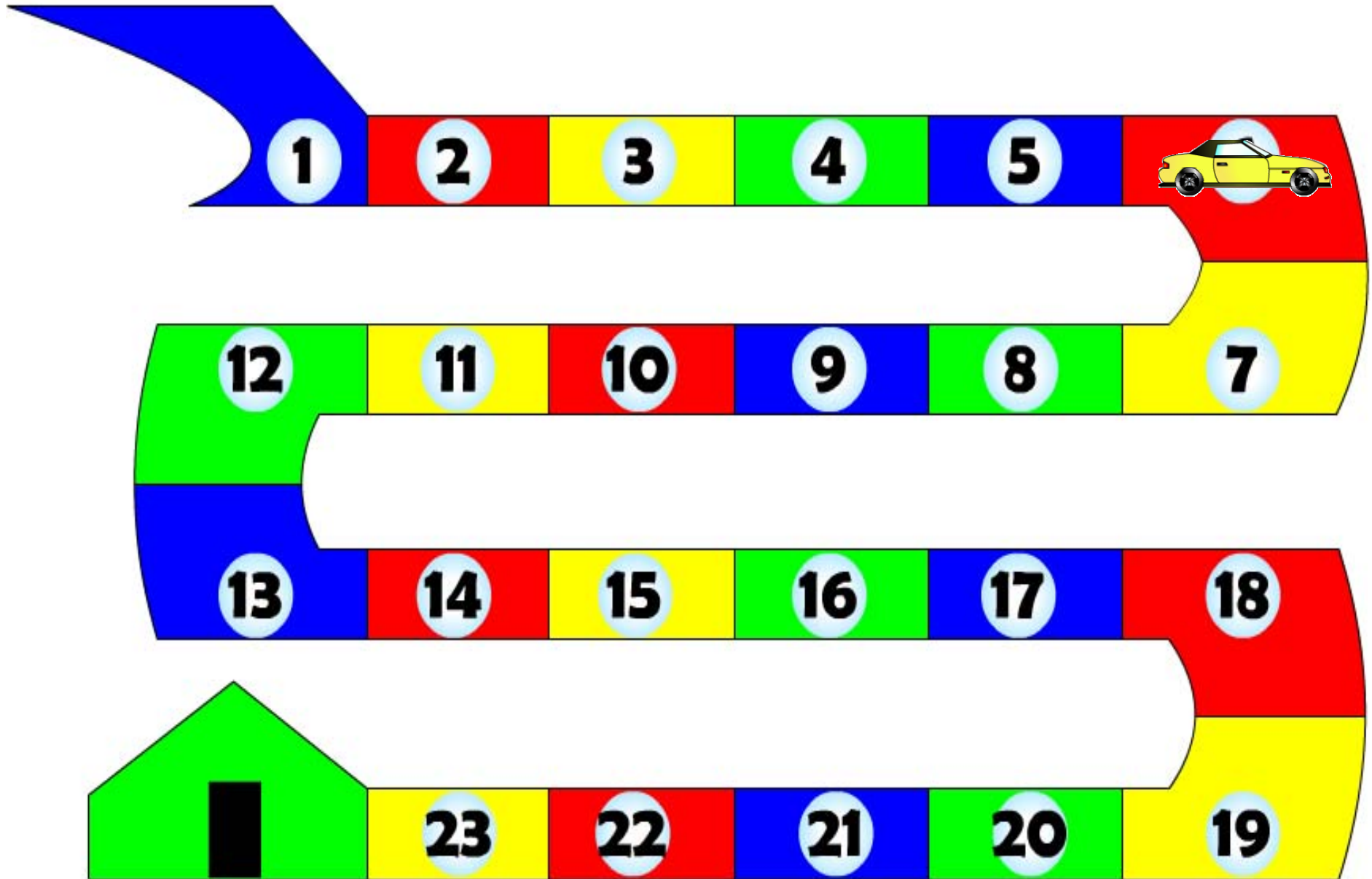


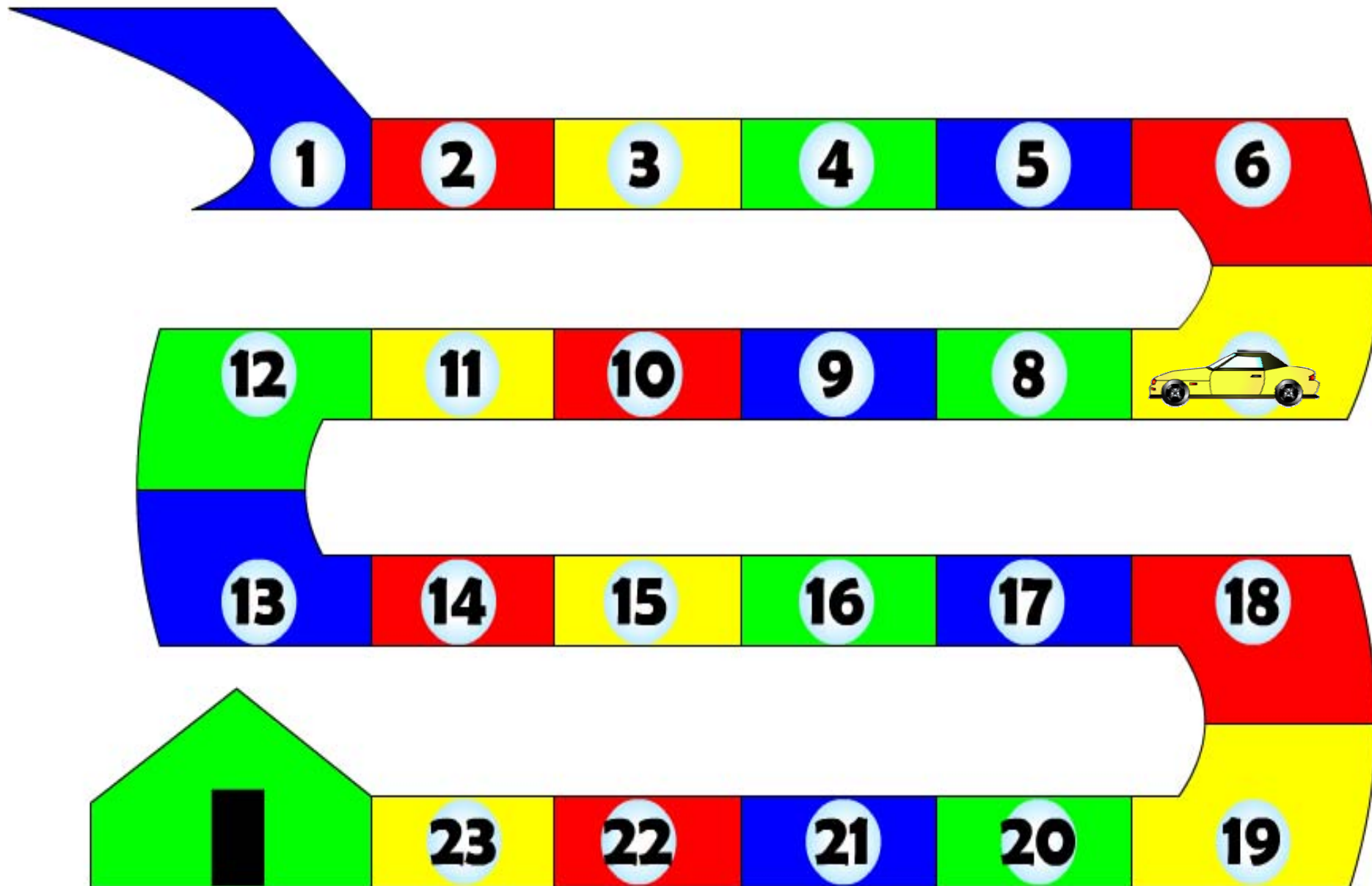


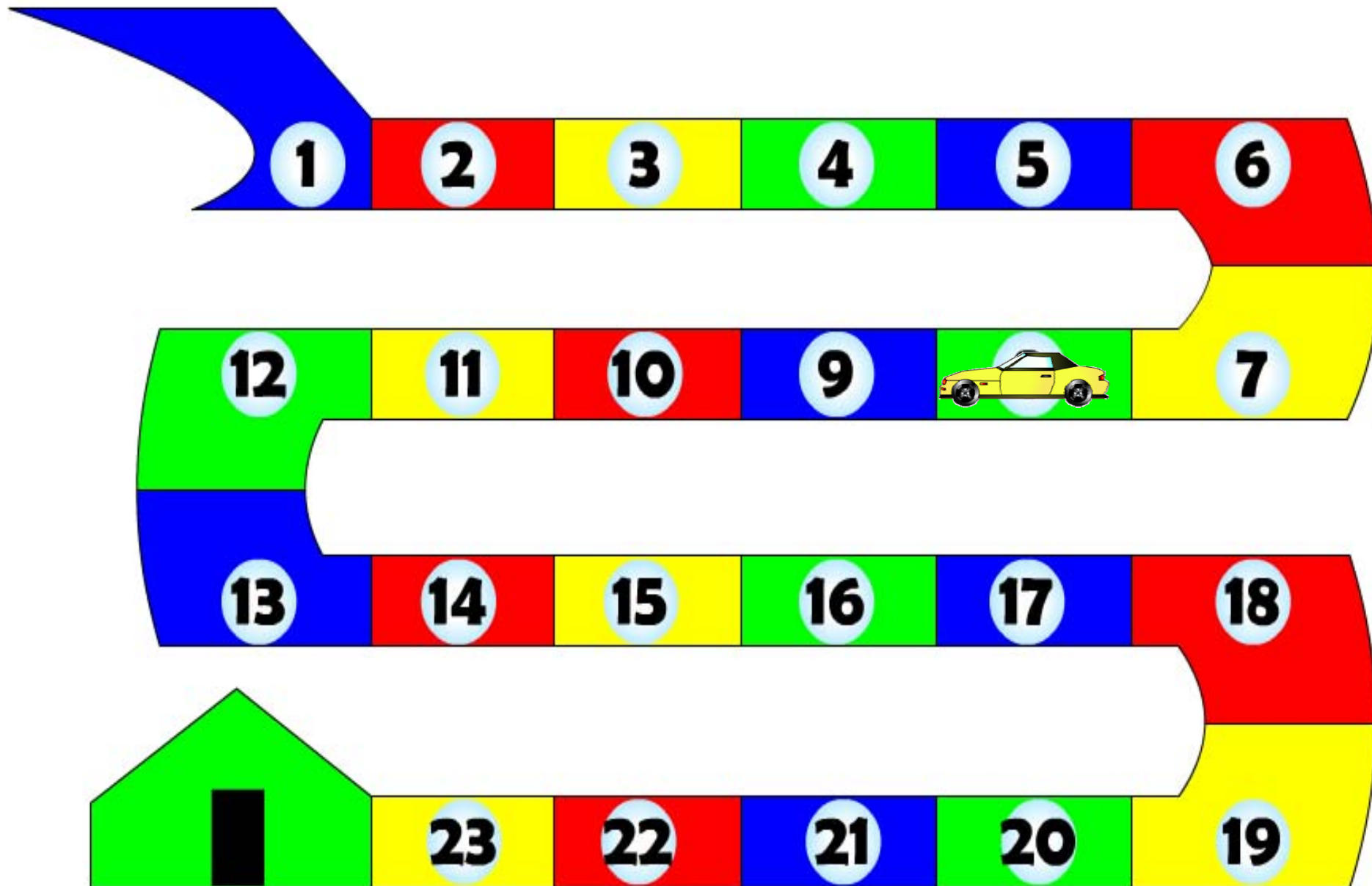


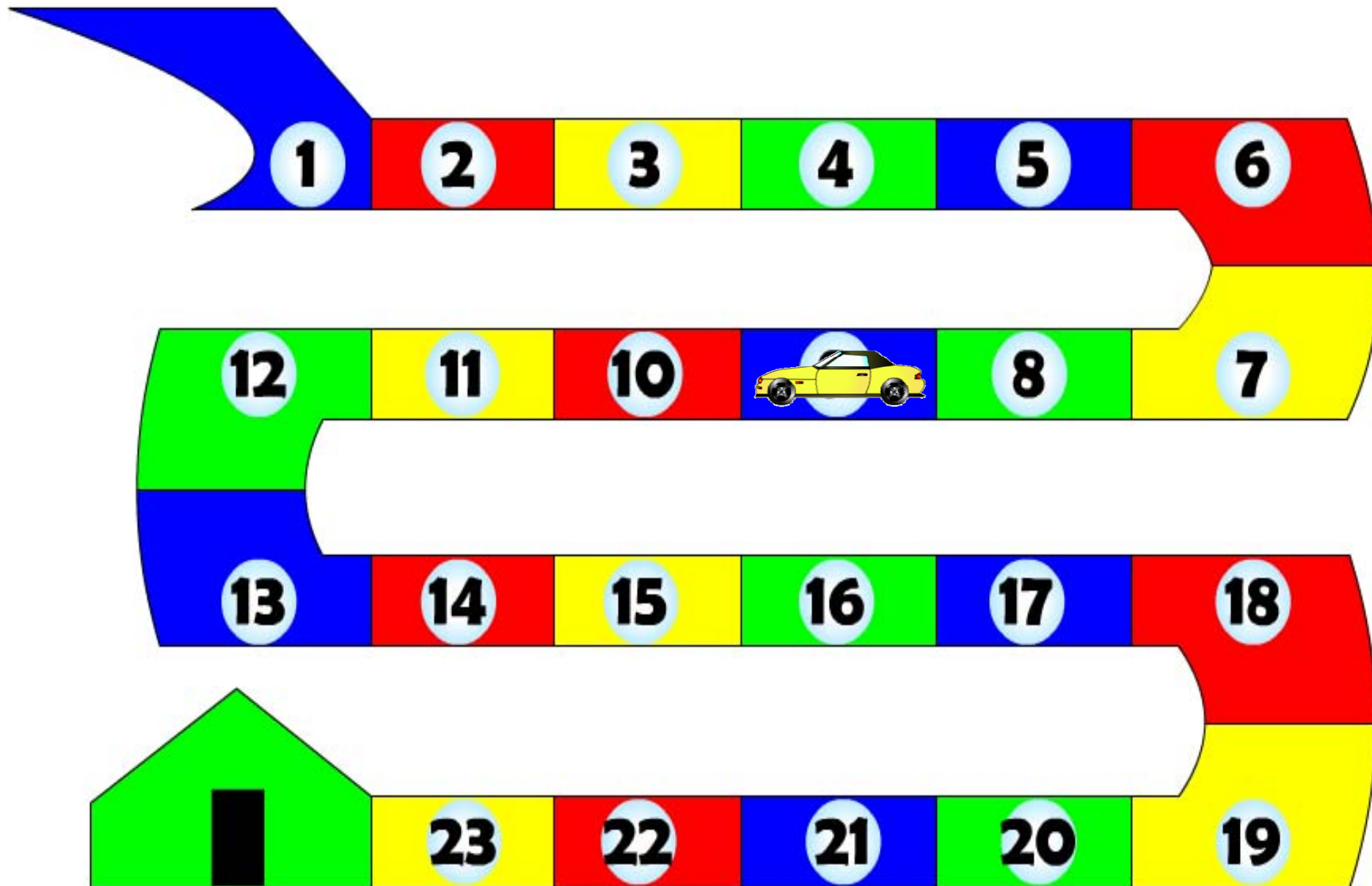


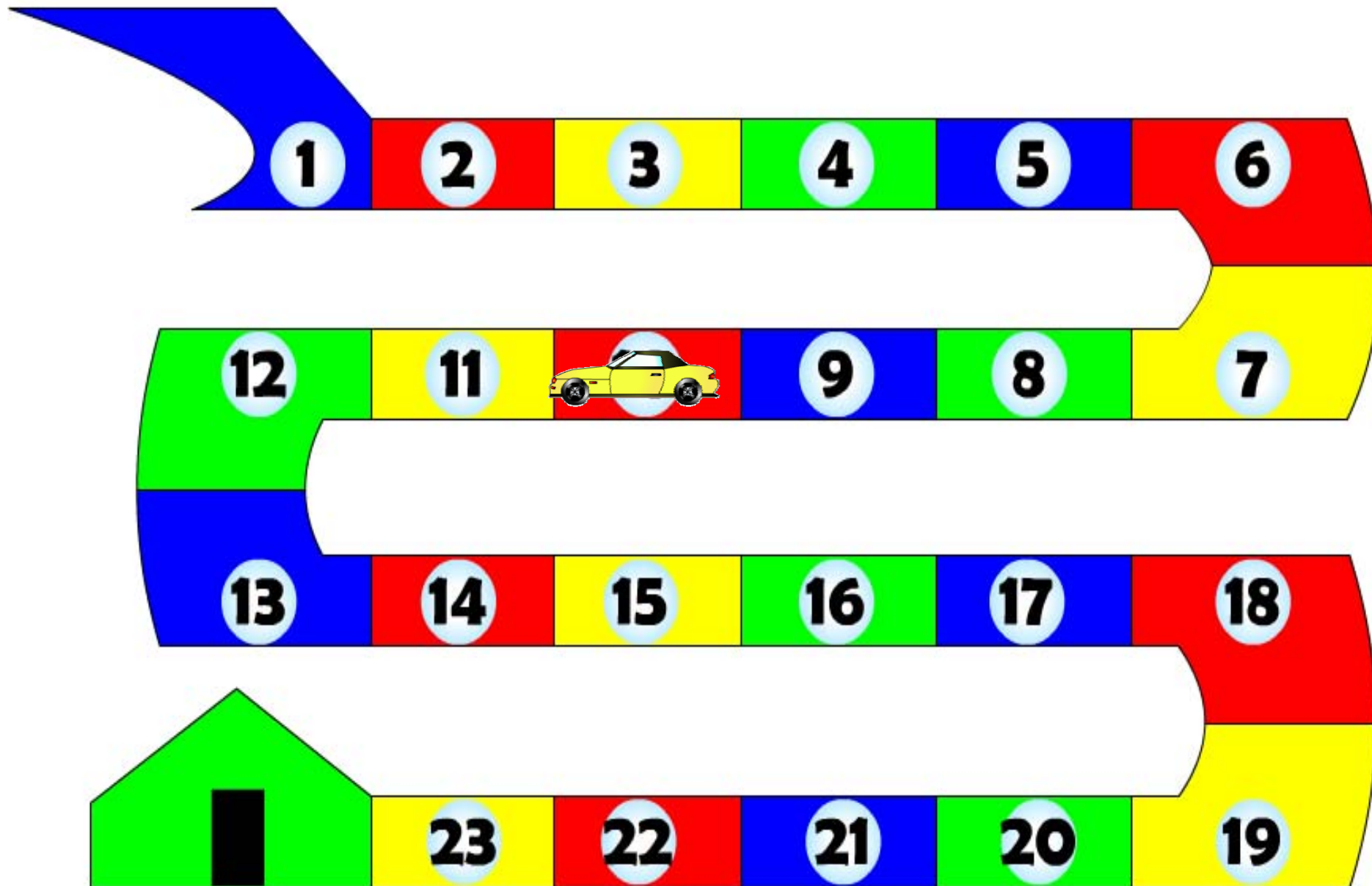


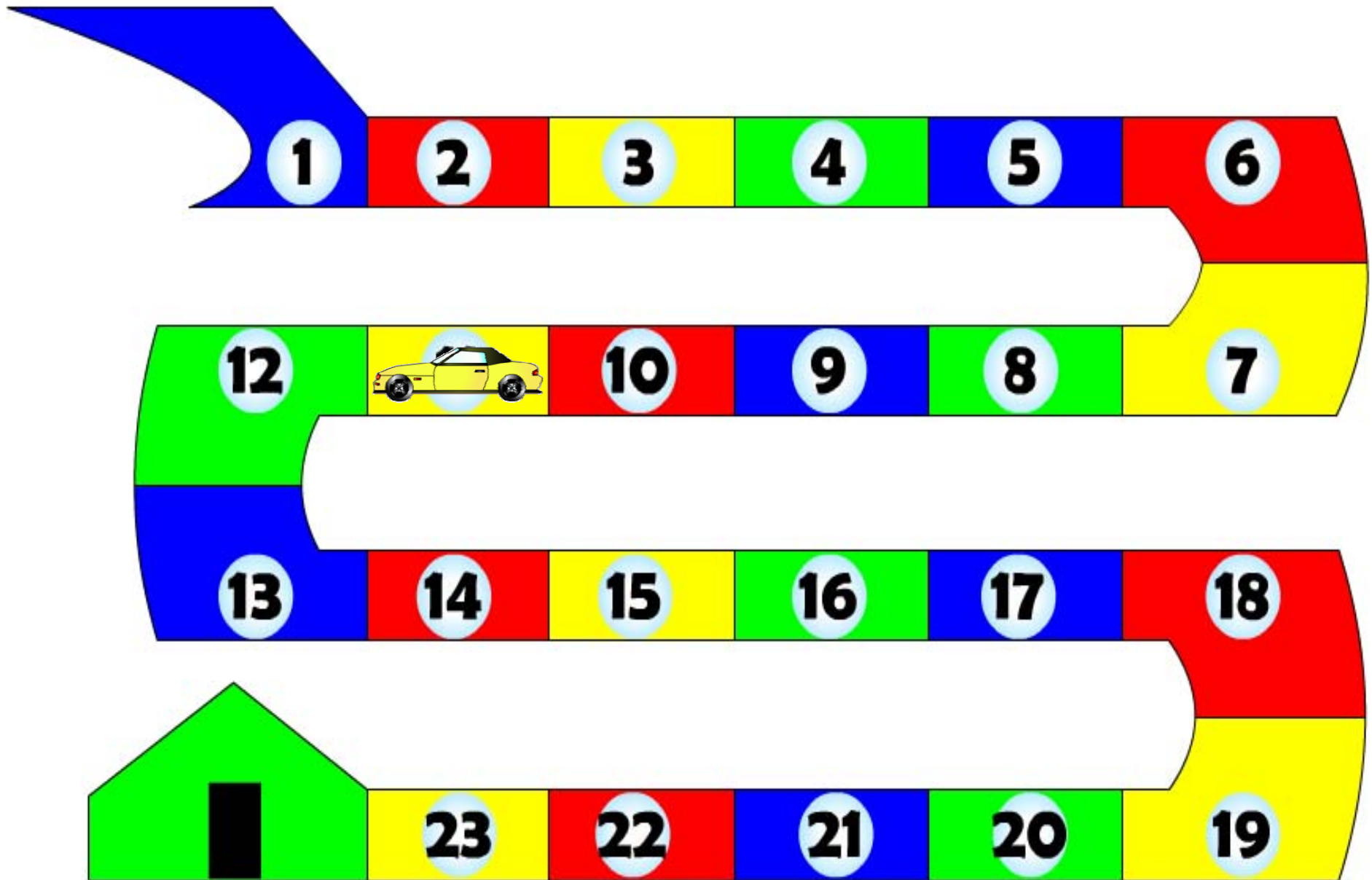


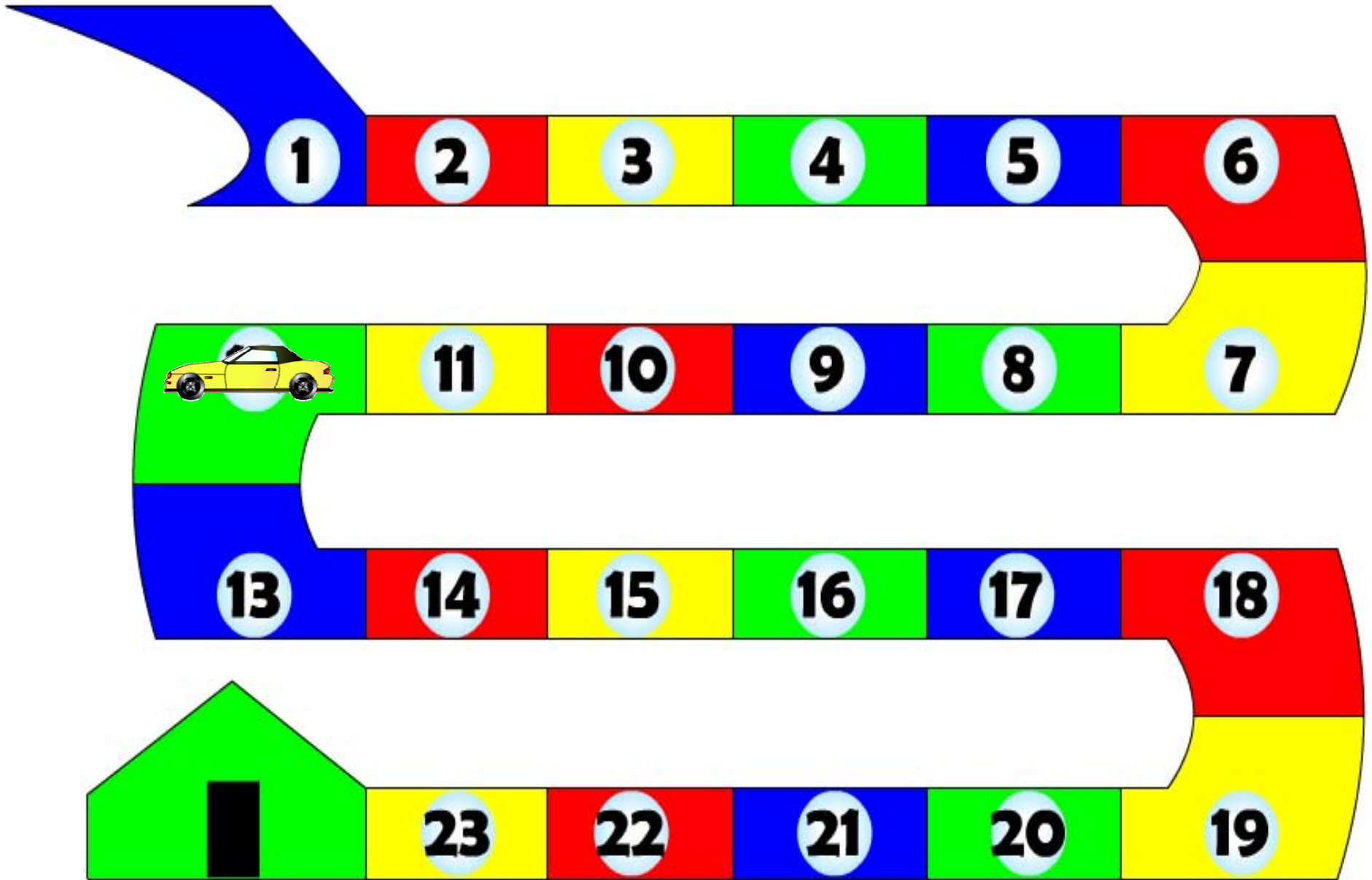


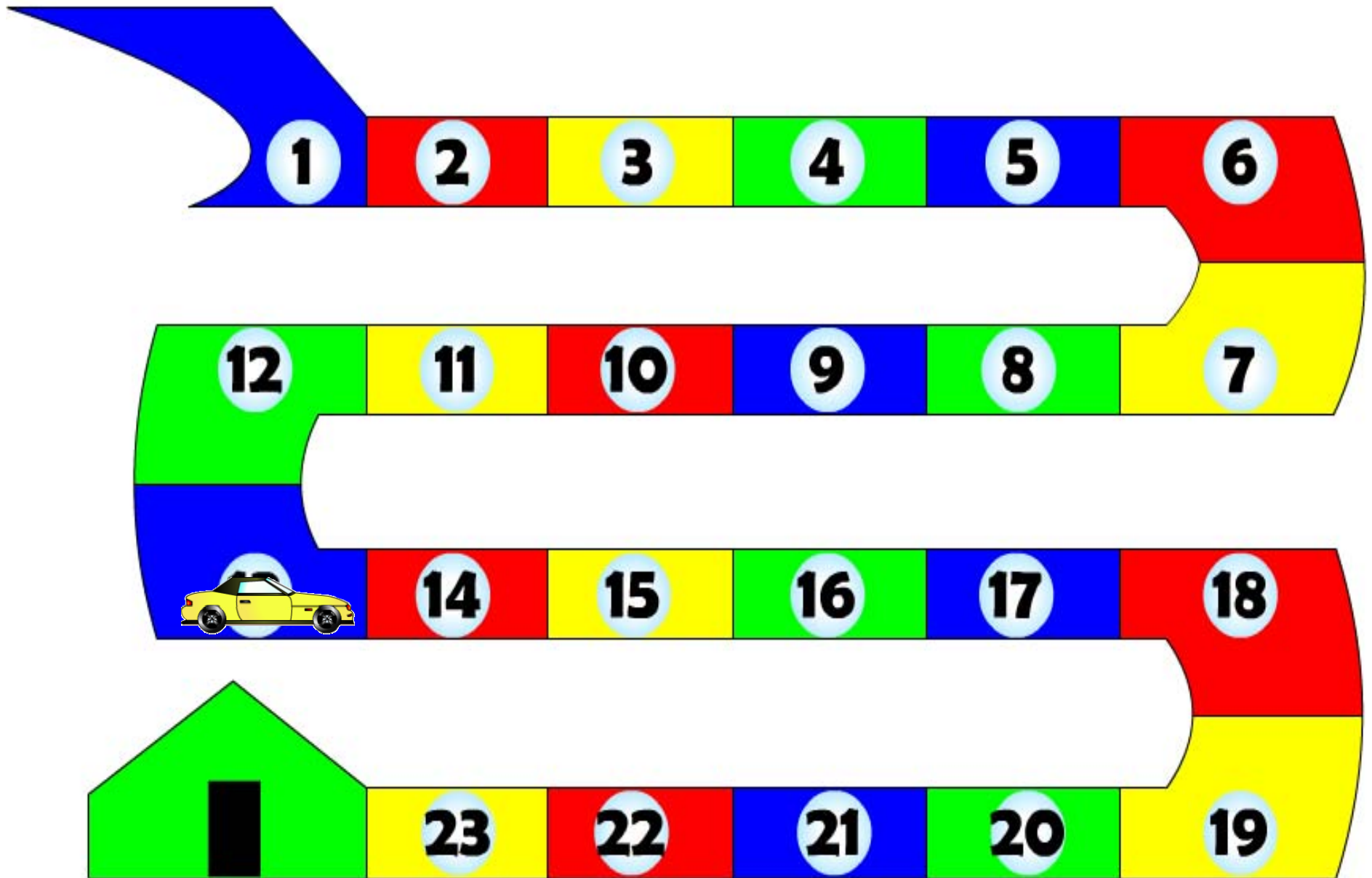


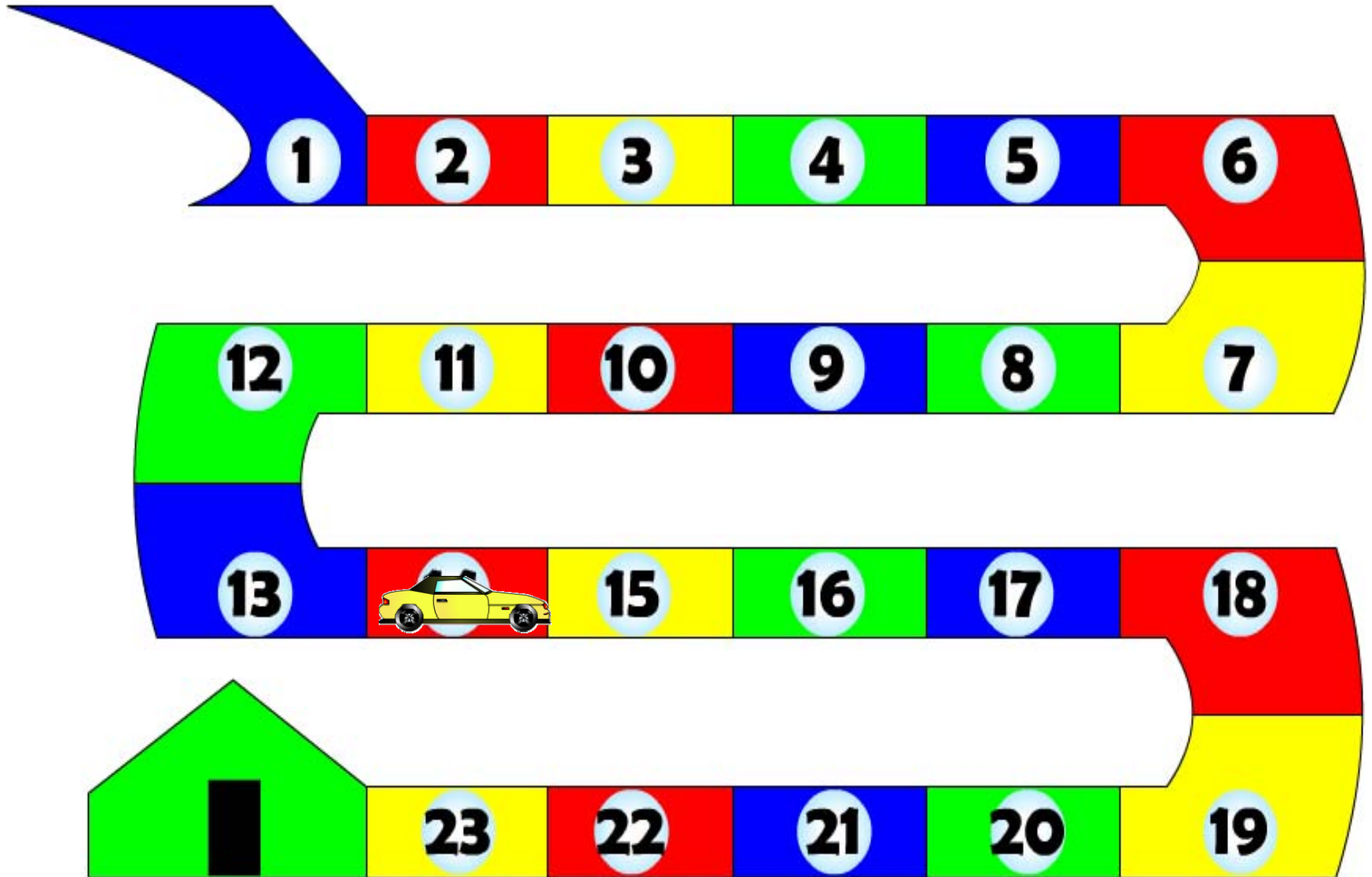


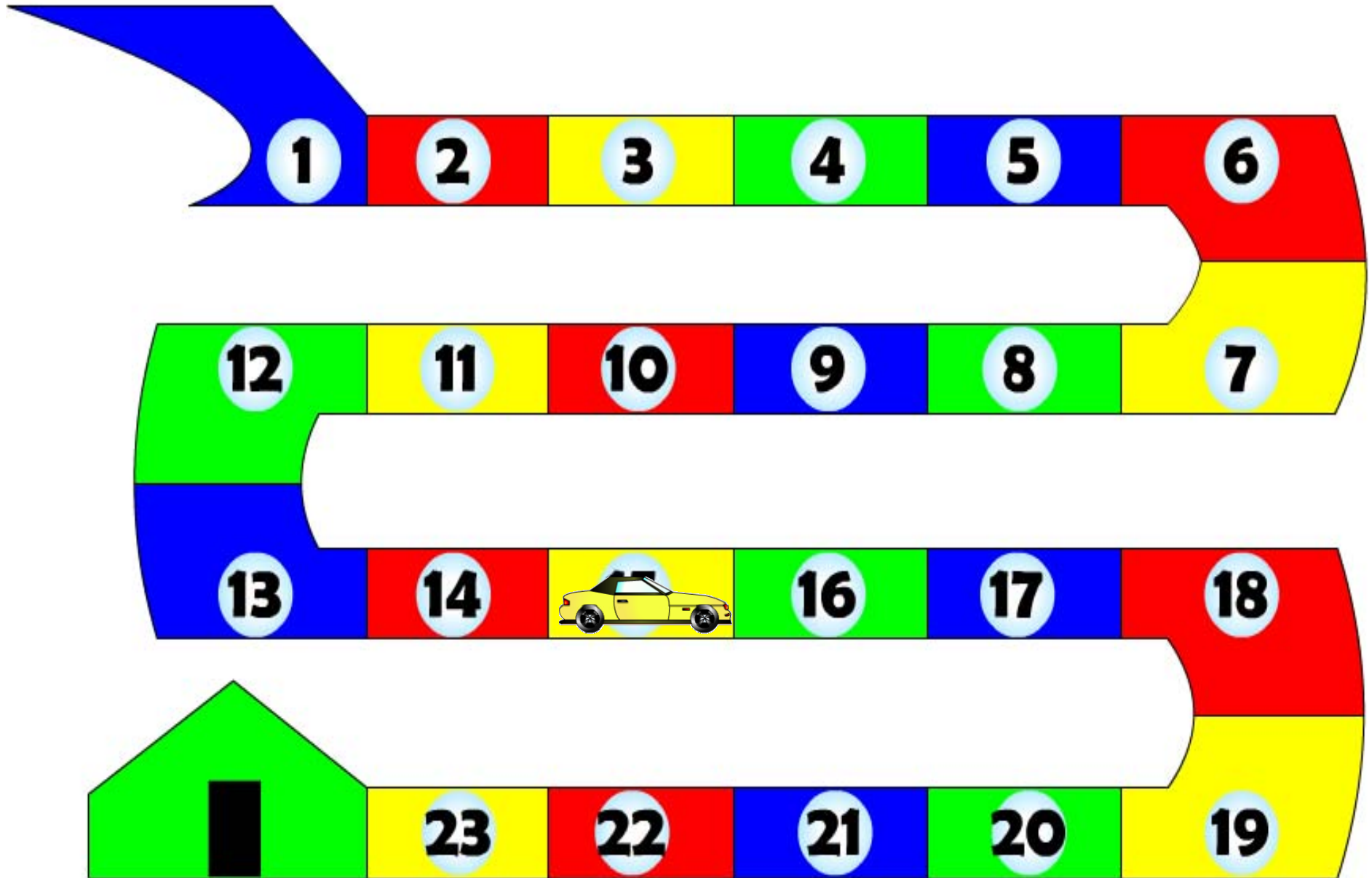


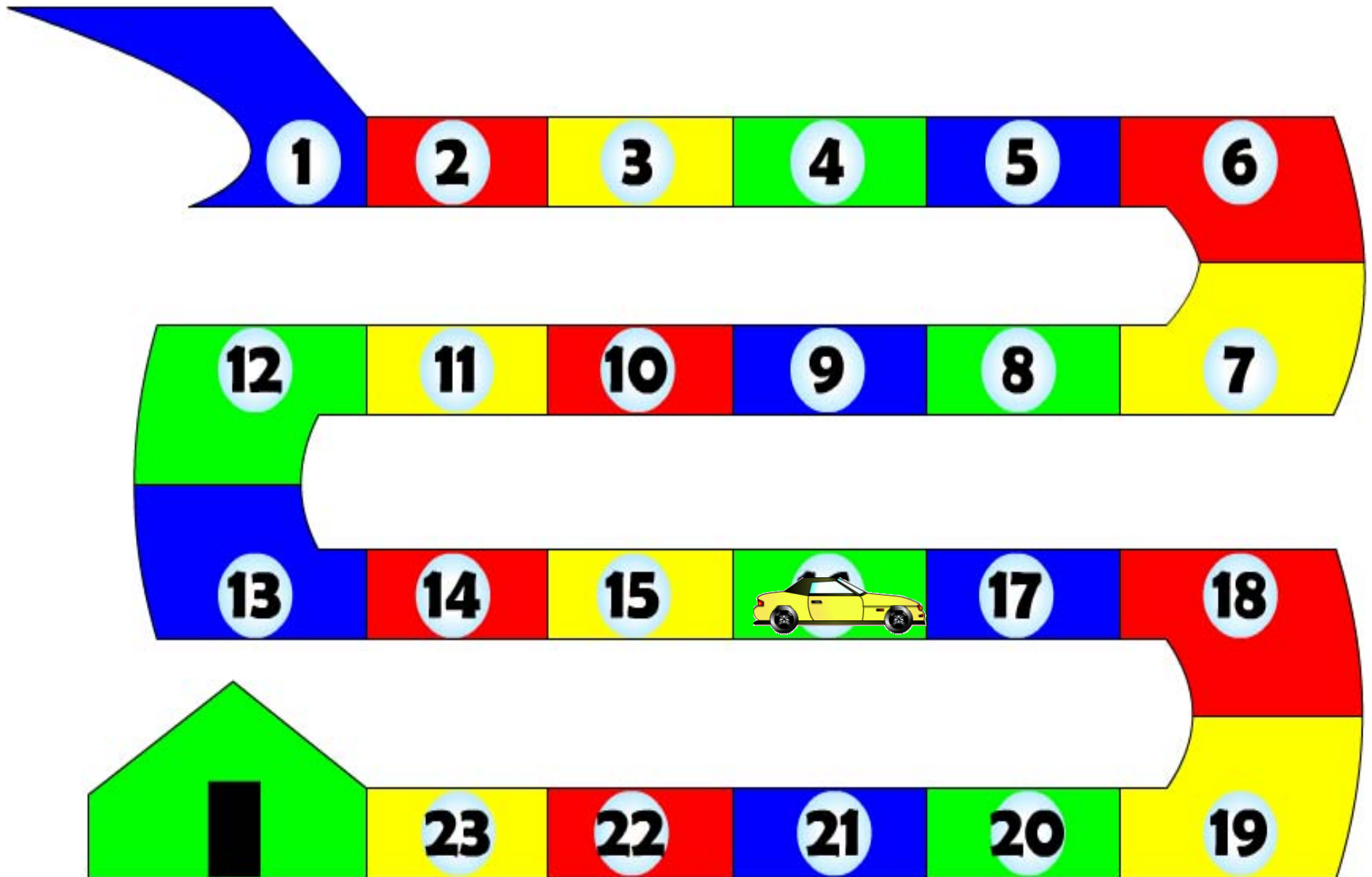


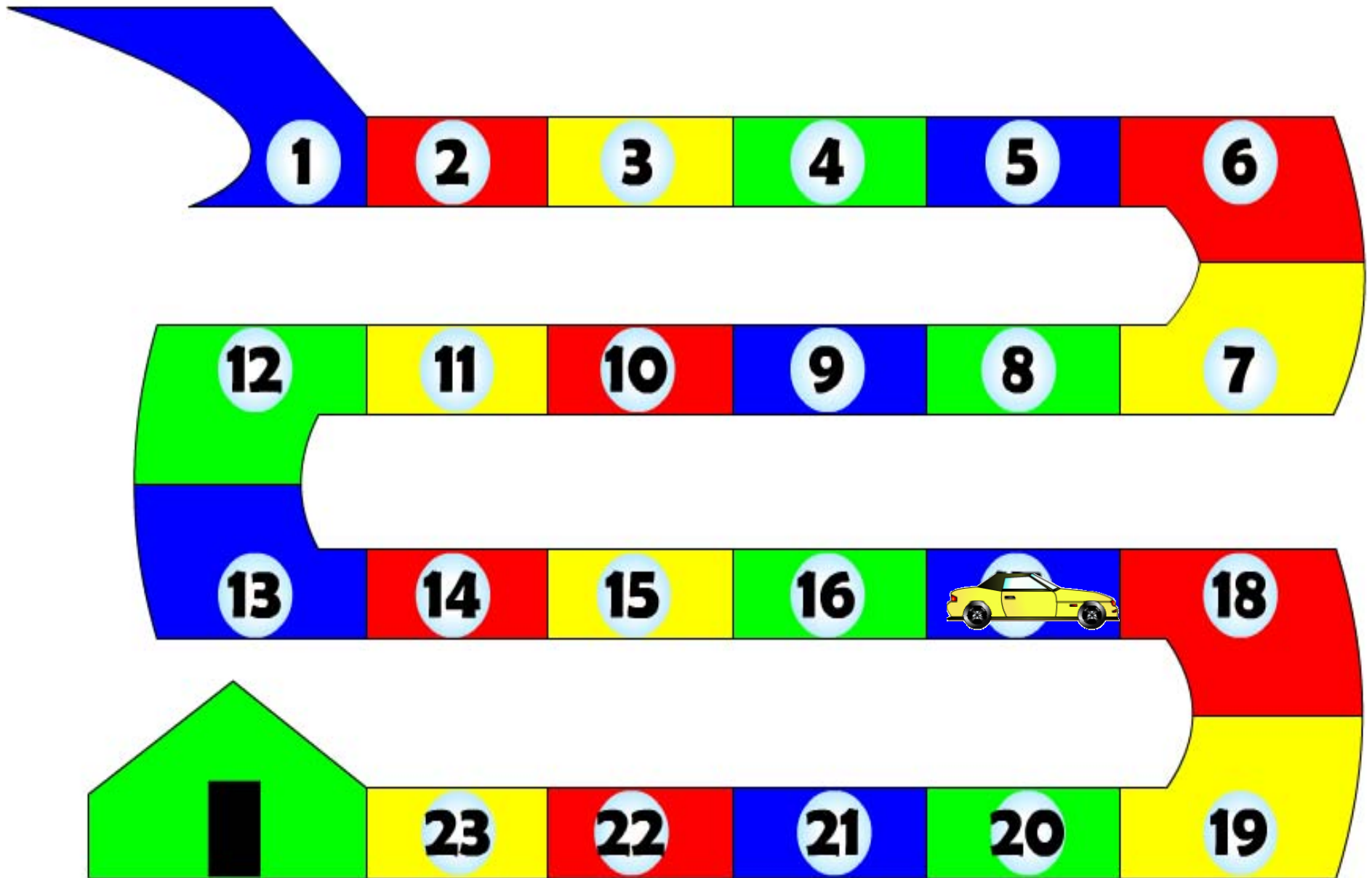


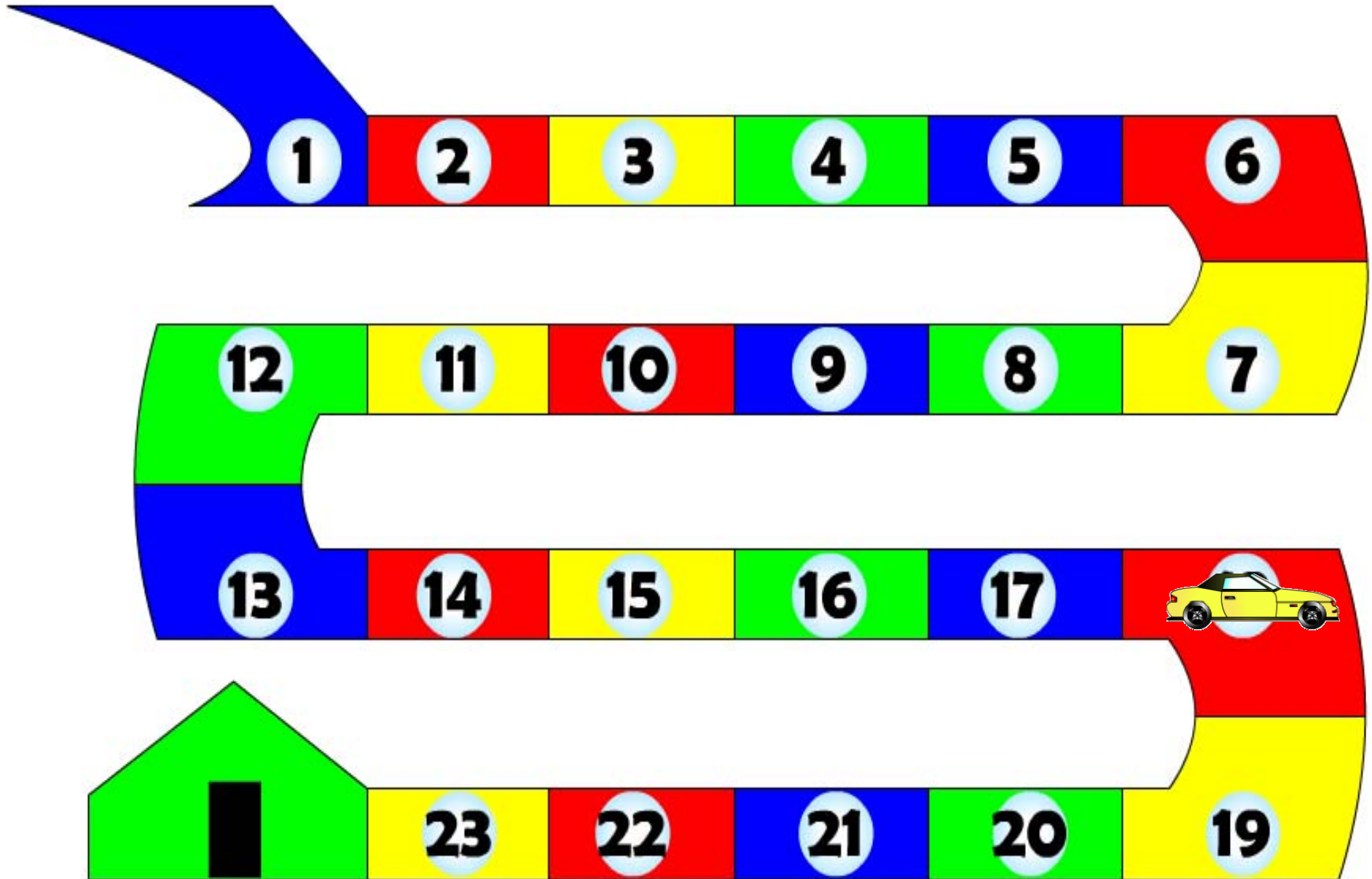


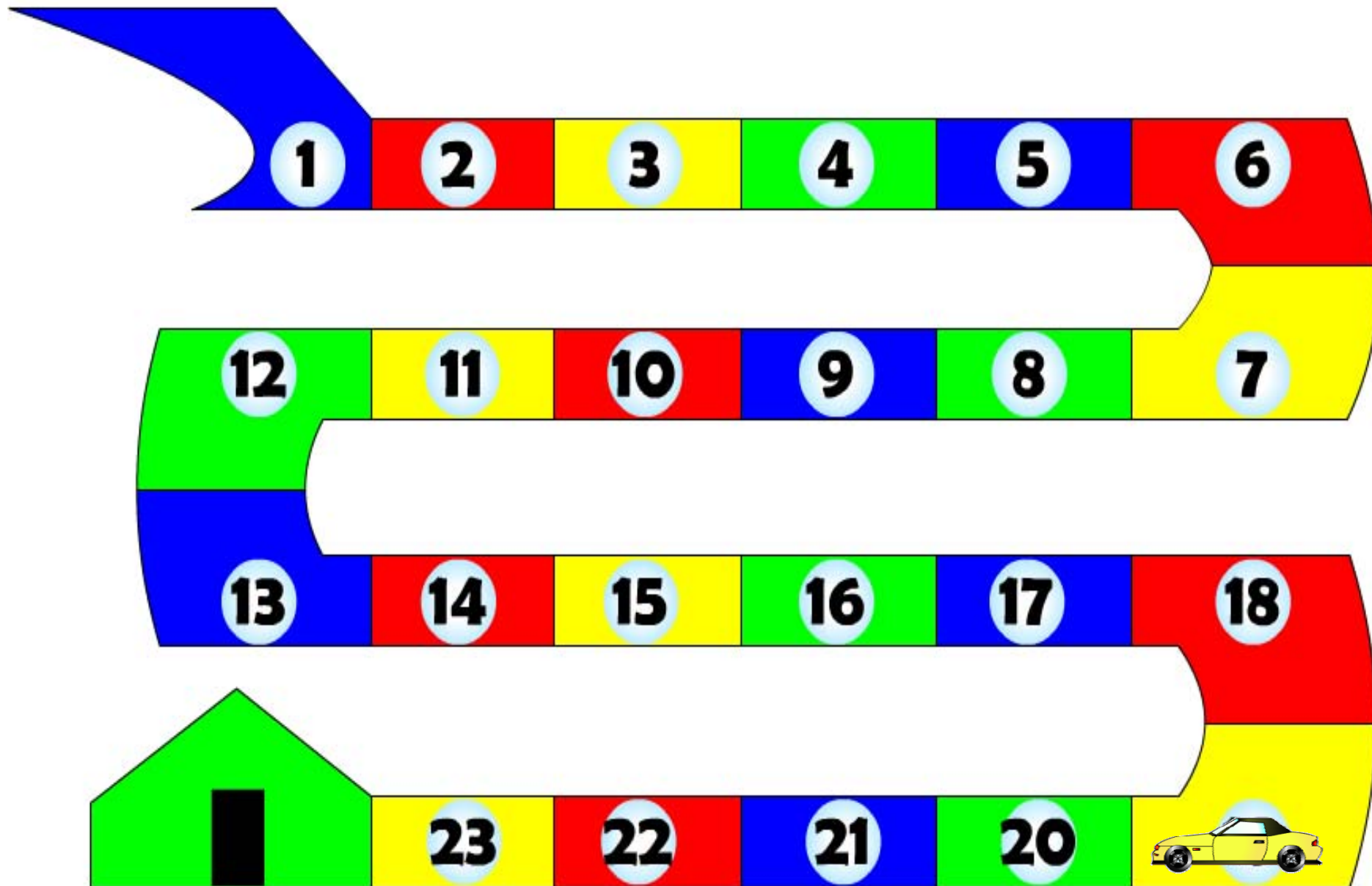


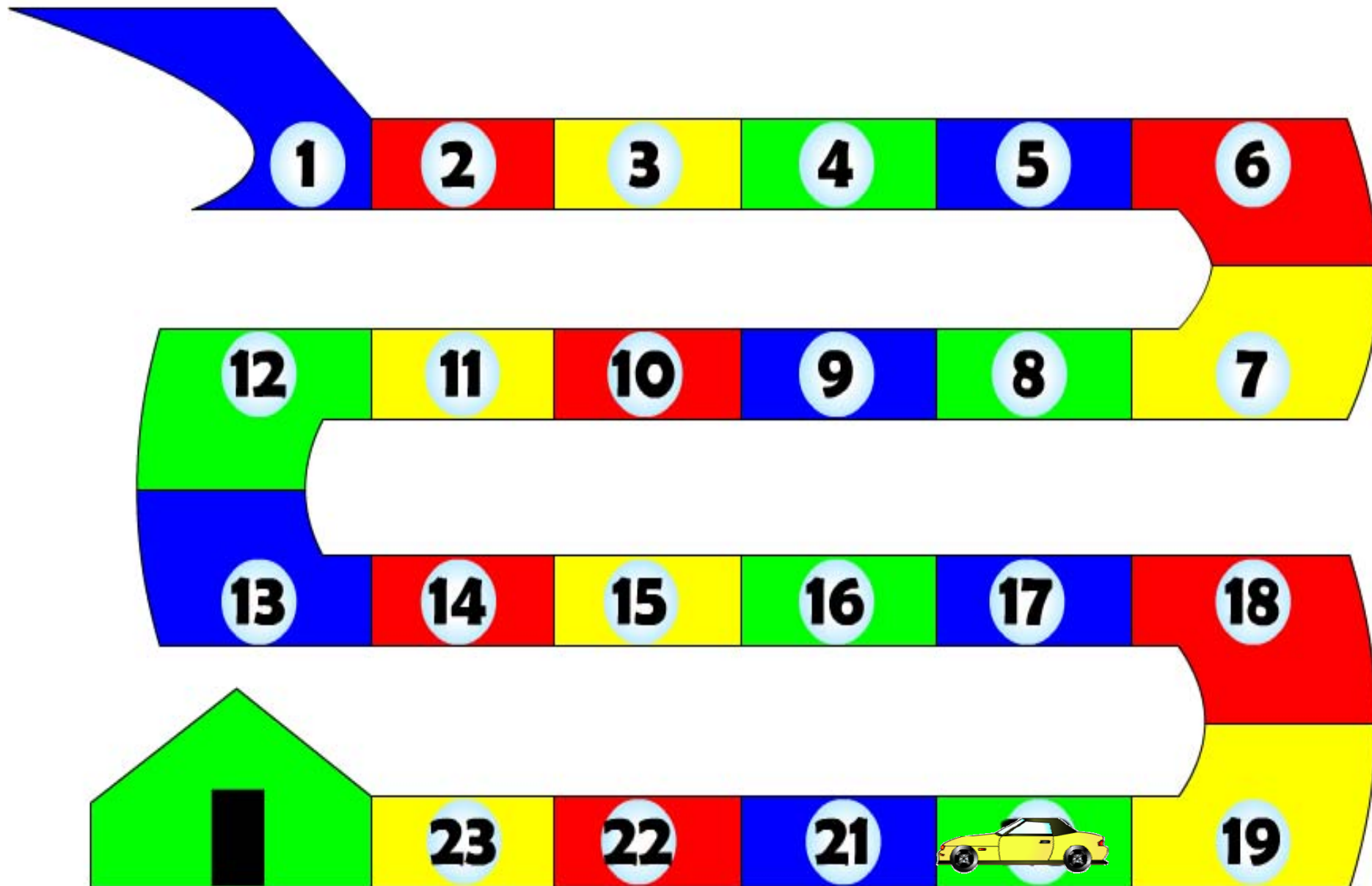


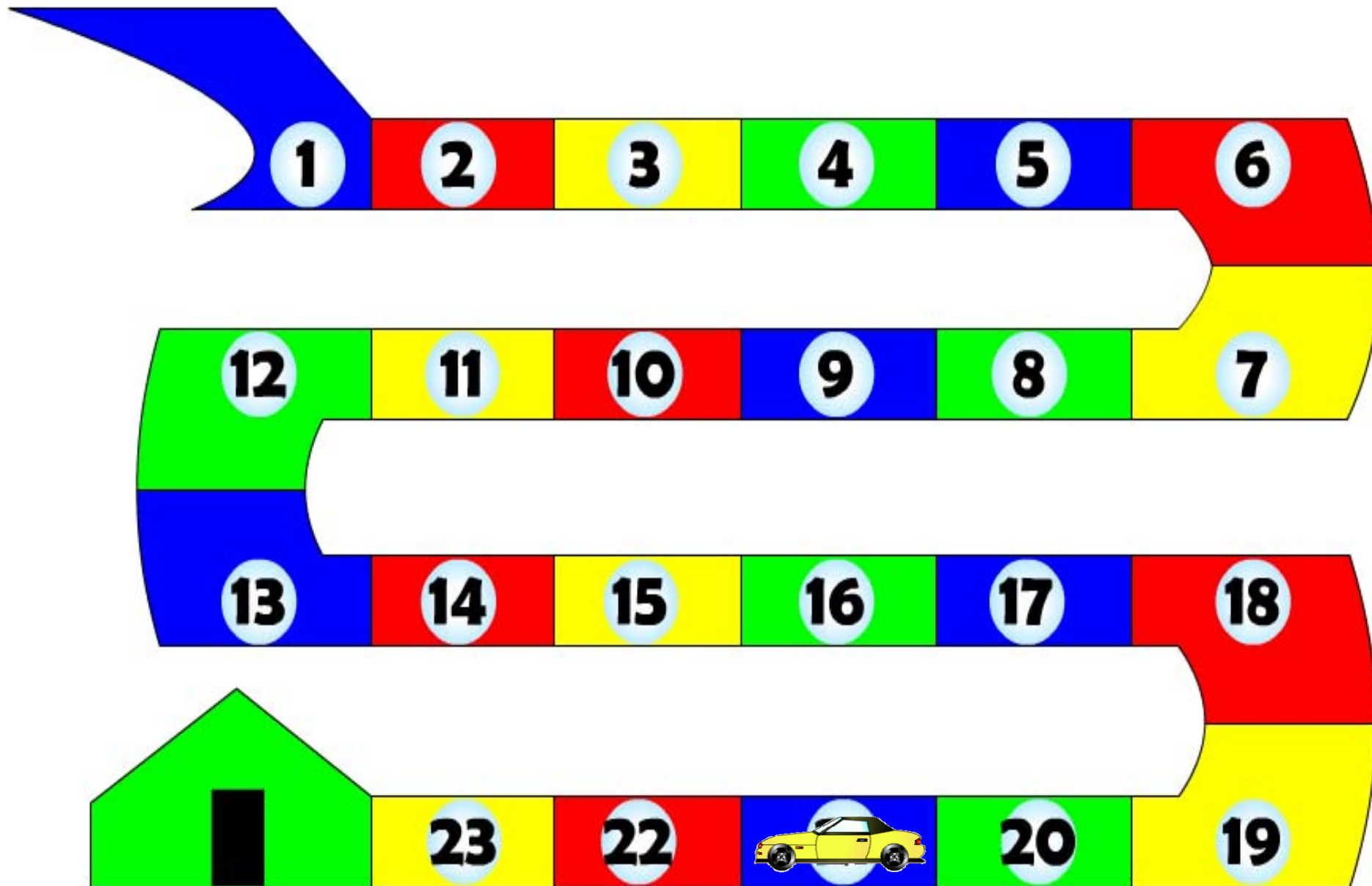


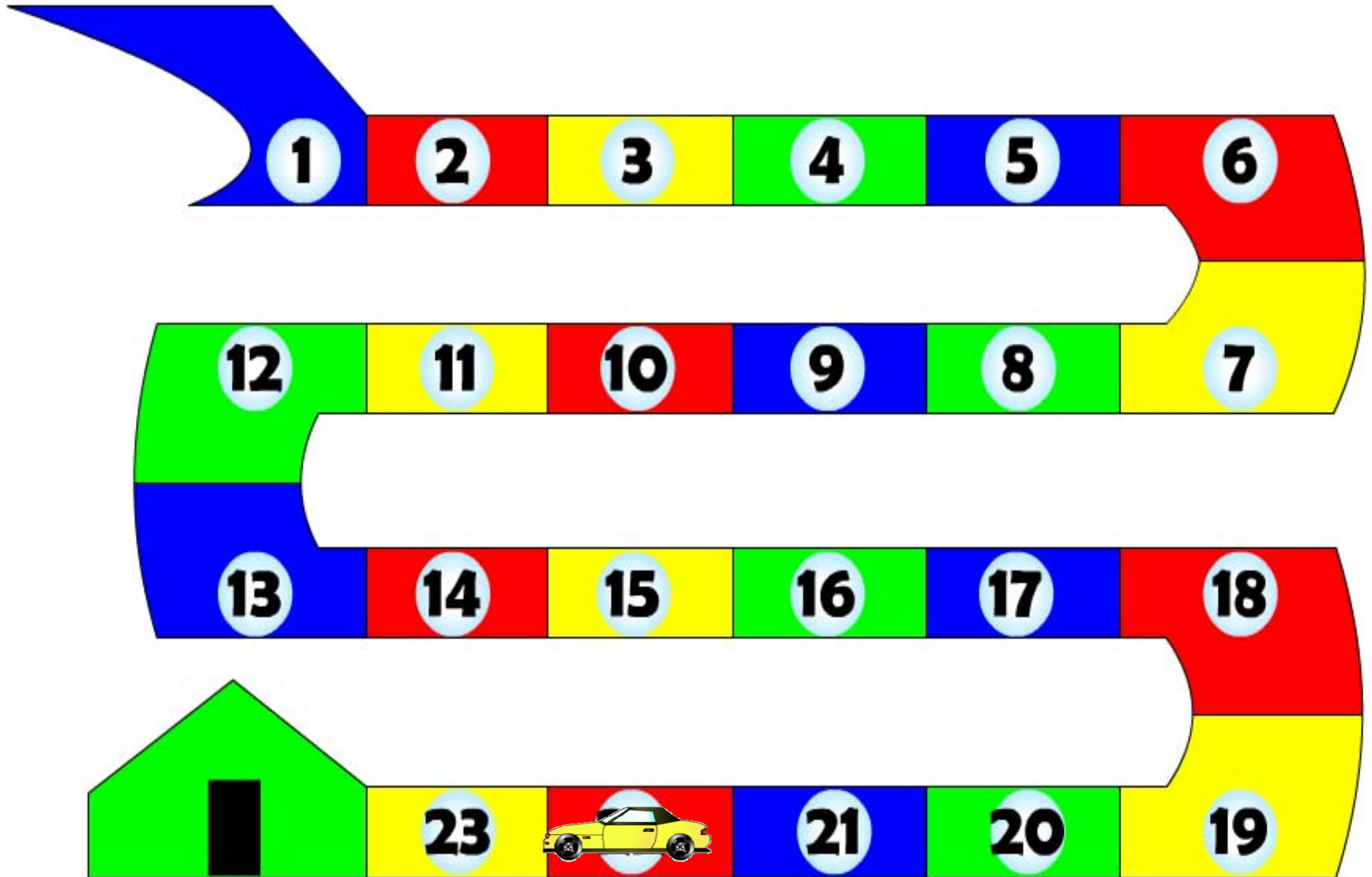


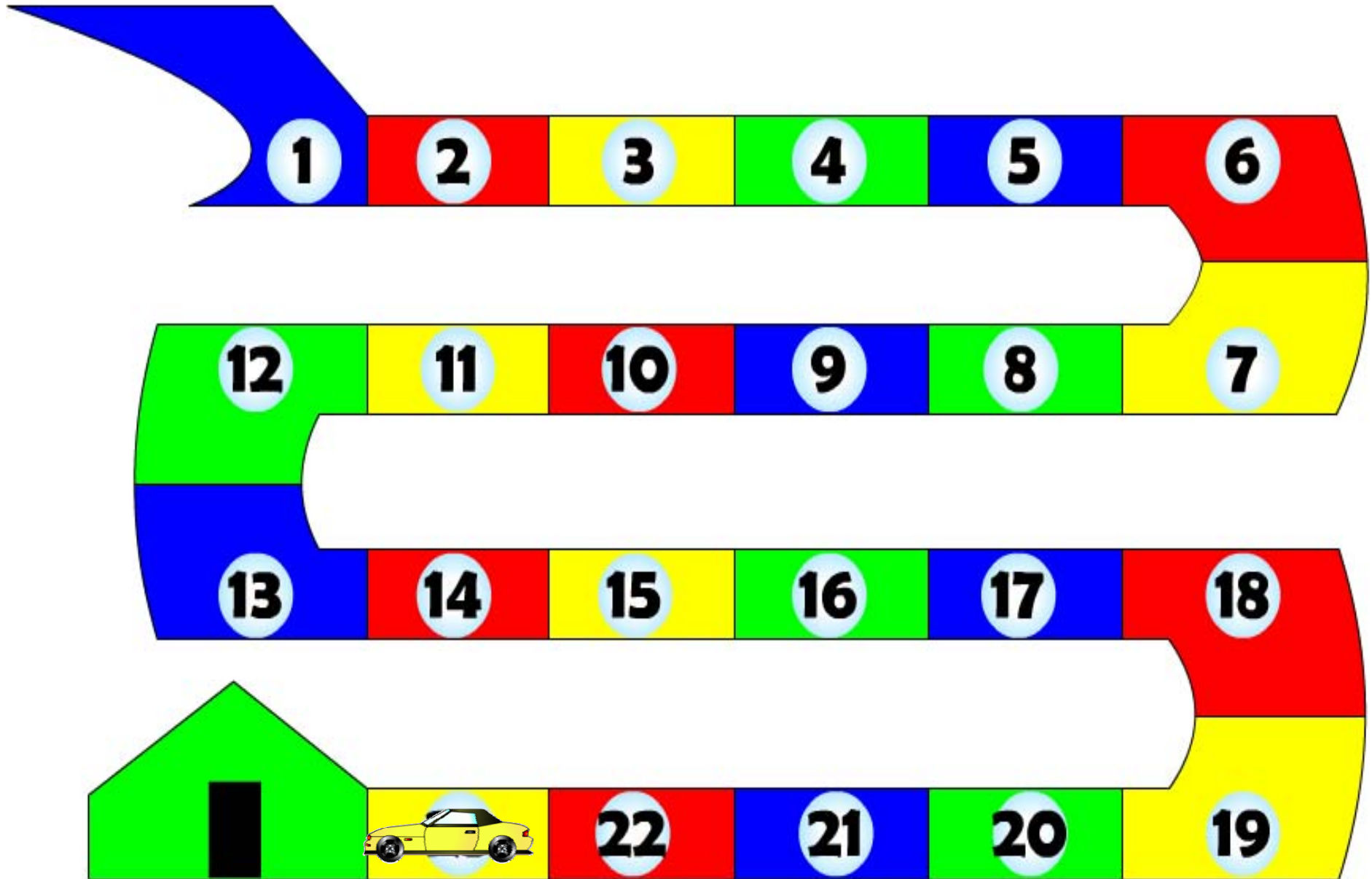












You got home safely. Excellent work!

